

Submitted To:

**Federal Communications Commission
Rural Health Care Pilot Program**

Proposal

for

Virginia Acute Stroke Telehealth (VAST) Project

RE: WC Docket No. 02-60



OFFICE of TELEMEDICINE

May 2, 2007

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Federal Communications Commission
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WC 02-60
Rural Healthcare Pilot

The Office of Telemedicine of the University of Virginia Health System submits the following proposal to the Federal Communications Commission in response to the above referenced Report and Order regarding the FCC Pilot for the Rural Healthcare Support Mechanism. This proposal promises to facilitate enhanced access to healthcare services in the Commonwealth by expanding the existing broadband infrastructure in Virginia and in particular, by building and deploying an MPLS network (Multi Protocol Label Switching), initially in the most underserved regions where limited bandwidth has been deployed. We plan to ultimately transition all the Commonwealth's health providers to this technology so as to deliver clinical services, educational offerings and to facilitate interoperable health information exchange. It is anticipated that all the State government entities (Virginia Department of Health, Emergency Medical Services etc) will also transition to the MPLS core.

After six months of strategic planning, it has been determined that a reduction in the disparities related to stroke, and its co-morbidities of hypertension, diabetes and heart disease is a goal very much aligned with the needs of the Commonwealth as articulated by health status indicators and the Governor's Healthy Virginians initiative. In particular, we hope to reduce the morbidity and mortality of stroke in Virginia, where currently, fewer than 2% of eligible patients receive life saving thrombolytic therapies for acute stroke. We have secured significant matching funds from agencies of the Commonwealth to implement this proposal. Our proposal partners include the Virginia Department of Health, the Virginia Telehealth Network, Virginia Polytechnic and State University, Virginia Commonwealth University, the Tobacco Commission and the Virginia Department of Housing and Community Development in addition to many healthcare facilities in the Commonwealth.

This effort will be accomplished through greater access to education and prevention programs, and via improved stroke related emergency medical services, primary care and specialty services. Through the use of advanced technologies, we propose to expedite acute stroke diagnosis, and, where appropriate, support the judicious administration of thrombolytic agents through telehealth. We propose to connect the Commonwealth's primary stroke centers, academic medical centers, community hospitals, and community health centers along with the relevant agencies of the Commonwealth.

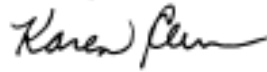
Marlene Dortch
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We have also requested funding for emergency medical service (EMS) providers in this acute stroke intervention network. Although EMS providers have previously been considered ineligible under the current rural health care program, we hope that the commission will consider their statutory authority to include such a request for the pilot program, as EMS providers serve the public interest and are "essential to public health and public safety". EMS providers are often the first and sometimes the only healthcare providers able to access and care for people in the most rural areas.

Alternatively, should the Commission determine EMS providers are not eligible even under the Pilot program, we would request consideration of all other elements of this proposal.

We hope the Commission will look favorably upon this request and are grateful for your consideration of this proposal.

Sincerely,



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EXECUTIVE SUMMARY

The University of Virginia (UVA) submits the following application to the Federal Communications Commission (FCC) for the Rural Health Care Pilot Program on behalf of and in partnership with the Commonwealth of Virginia and its academic medical centers, universities, urban and rural healthcare providers, state health and information technology agencies, and health care associations. We request \$1.71 million from the FCC and offer \$1.66 million in matching funds, as strong evidence of our commitment to this project.

This opportunity serves as a catalyst for integrating technology more broadly into the Commonwealth's public and private health care sectors. We have aligned this effort with a major health disparity affecting all Virginians, but in particular our rural citizens. In 2006, fewer than 2% of eligible Virginia stroke patients received time sensitive, brain-saving, thrombolytic therapy. Therefore we propose to use telehealth applications to improve prevention, diagnosis, and treatment of stroke (including supporting the administration of thrombolytic agents) and its co-morbidities of heart disease, hypertension, diabetes and obesity, to improve the health of the citizens of the Commonwealth.

All parties involved recognize the importance of having this program under the leadership of an organization with the expertise to manage and direct such an important statewide initiative. With the support of all organizations involved, the Office of Telemedicine of the University of Virginia Health System has been chosen to be the applicant for the Rural Health Care Pilot Program. The Office of Telemedicine has more than 10 years of experience in delivering rural and urban telehealth/telemedicine services, conducting telehealth research, and in utilizing and continuously supporting (24 x 7) broadband networks to deliver remote healthcare services.

Under the leadership of the Office of Telemedicine, with this proposal, our primary objectives are to:

- Enhance and expand the broadband footprint and network infrastructure to eligible health care providers so as to support the clinical goals of our telehealth initiative
- Monitor and evaluate the network strategy and technical approach
- Report findings to the FCC

The FCC's release of the Rural Health Care Pilot Program coincides with Virginia's own efforts to deploy a network dedicated to distributed health care services and education. Over the past four years, a

collaboration of professionals representing more than 80 organizations from all regions of the Commonwealth has come together to form the Virginia Telehealth Network (VTN). The VTN has defined the clinical and technical requirements for Virginia's statewide telehealth network. These requirements form the basis for our network design.

With the announcement of the Rural Health Care Pilot Program, the VTN has partnered with the Virginia Stroke Systems Task Force, to propose a business plan to create the Virginia Acute Stroke Telehealth (VAST) Network. Stroke is the third leading cause of death in Virginia and with its co-morbidities of diabetes, obesity and hypertension; we believe this new initiative will further the goals of the Virginia Department of Health and the American Stroke Association in strengthening stroke systems of care on a statewide basis.

In implementing VAST, Virginia's broadband network underutilization will be addressed on three different levels:

1. Broadband build-out and implementation of advancing technologies,
2. Technical support for a positive end-user experience,
3. Needs-driven telehealth applications.

1. Broadband Build-out and Implementation of Advancing Technologies

Although there are currently several intrastate telecommunication broadband networks within Virginia, we have chosen to use this pilot opportunity to enhance and build out new broadband infrastructure and connectivity using MPLS network technologies, which the Commonwealth has selected for its state agencies.

It is envisioned, that all participating healthcare providers will be migrated to a dedicated MPLS network over time. However, for the first phase implementation of VAST, our technical team has designed a very flexible "hybrid" network which rapidly enables the program's initial 48 healthcare provider sites to collectively participate in VAST, and begin utilizing the benefits of MPLS technologies via an interim solution. The different types of broadband technologies available will allow for the testing of different MPLS configurations and cost models, that once optimized, will ultimately serve as a customizable and replicable model for others to follow.

Our goal is to implement a network solution that is scaleable with future growth, and able to meet the increasing demands of healthcare providers for bandwidth, particularly to support the transmission of digital images, and high resolution video applications required for optimal acute stroke care and other clinical services.

2. *Technical Support for a Positive End User Experience*

Long-term growth in utilization is directly tied to the overall ease of use that health care providers experience as they access their telehealth applications, and the network. Many health care providers lack the resources to properly staff their facilities to support the requisite technology, which can limit utilization and overall acceptance of telehealth. We will test models of technical support and network management to better understand operational needs moving forward.

3. *Needs Driven Telehealth Applications*

A third objective is to design and implement a telecommunications network in the context of a clinical framework using the stroke continuum of care. By using stroke and its co-morbidities as our initial focus, we plan to address a major health disparity in rural and urban Virginia. Using the continuum as our roadmap, we will work alongside the Virginia Stroke Systems Task Force and healthcare providers, to continuously plan and expand telehealth services to meet clinical needs. This will help ensure end-users of the telehealth network (patients and healthcare providers) receive value for their participation.

UVA and its partners strongly believe that the statewide scale and clinical scope of this initiative calls for a highly qualified management team to ensure the cost, schedule and performance requirements of the Rural Healthcare Pilot Program are met over a one year period. Leading this effort, will be the Office of Telemedicine of the University of Virginia Health System, supported by a team of key individuals with distinguished careers in the fields of project management, telehealth, medicine and technology and will include a partnership with the Virginia Telehealth Network, which represents stakeholders throughout the Commonwealth.

Through the Federal Communications Commission's Rural Health Care Pilot Program, Virginia proposes to deploy a robust broadband telecommunications that will support the Virginia Acute Stroke Telehealth (VAST) Network. Through VAST and other applications, we anticipate a significant increase in the utilization of broadband networks for telehealth/telemedicine in Virginia. We have secured nearly dollar-for-dollar--matching funds as a testament to our dedication and the level of commitment of the

Commonwealth to this important initiative. We intend to apply for additional funding in the second year of the pilot to expand the VAST network throughout other regions of the Commonwealth.

COMPLIANCE MATRIX

PROPOSAL CROSS REFERENCE MATRIX		
Title / Compliance Requirement	Abbreviated Response	Proposal Response Section / Paragraph
1) Organization that will be legally and financially responsible for the conduct of activities supported by the FCC.	Office of Telemedicine, University of Virginia Health System	Section 1
2) Goals and Objectives of the Network	To deploy the Virginia Acute Stroke Telehealth (VAST) program	Section 3
3) Estimate of the network's total costs (recurring) per year	\$1,158,000	Section 7
4) Describe how for-profit network participants will pay their fair share of the network costs	All proposed sites are non-profit	Section 3
5) Identify the source of financial support and anticipated revenues that will pay for costs not covered by the fund.	Tobacco Commission and Virginia Department of Housing and Community Development matching funds State funds for related Virginia Telehealth Network Activities	Section 7
6) List the health care facilities that will be included in the network.	48 Sites requested	Appendix A
7) Provide the address, zip code, Rural Urban Commuting Area (RUCA) code and phone number for each health care facility participating in the network.	Included	Appendix A
8) Indicate previous experience in developing and managing telemedicine programs.	Developed in 1995, the UVA Office of Telemedicine has 12 years experience in designing and managing an extensive regional telehealth program	Section 6 Appendix B

PROPOSAL CROSS REFERENCE MATRIX		
Title / Compliance Requirement	Abbreviated Response	Proposal Response Section / Paragraph
9) Provide a project management plan outlining the project's leadership and management structure, as well as its work plan, schedule, and budget.	Leadership structure, partners, management approach, work plan and schedule included	Section 6
10) Indicate how the telemedicine program will be coordinated throughout the state or region.	UVA will work in close cooperation with the Virginia Telehealth Network and Virginia Stroke Systems Task Force	Section 5
11) Indicate to what extent the network can be self-sustaining once established.	Utilization and sustainment Strategies proposed	Section 5

1.0 INTRODUCTION

Healthcare providers in Virginia are either not connected or are poorly connected to one another – there are many reasons why this is the case – Virginia understands the business problem and has developed a strategy to drive the adoption of telehealth applications to ensure network infrastructure has value and therefore is worth having and sustaining.

The Office of Telemedicine of the University of Virginia Health System (UVA) is pleased to apply on behalf of the Commonwealth of Virginia for funding consideration for the Federal Communication Commission's (FCC's) Rural Health Care Pilot Program. Given the health disparities in rural areas--and throughout the state--Virginia is deeply committed to strengthening connectivity between healthcare providers on a statewide basis.

Over the past several years, interested parties in the Commonwealth of Virginia, including the academic medical centers, the Virginia Department of Health, the Virginia Hospital and Healthcare Association, the Virginia Primary Care Association, the Virginia Rural Health Association and other members of the Virginia Telehealth Network have collaborated to develop technical and functional requirements for a state-wide telehealth network. Virginia has been able to leverage these prior efforts and relationships toward the development of this proposal. In fact, the proposal process has been a catalyst for jump-starting statewide telehealth planning and development, and reestablishing commitments.

There is no question that there is much work to do. Despite the availability of telehealth services in Virginia, there is not wide-spread adoption of these services by rural healthcare systems. In some cases, it is a matter of broadband availability, however, in others cases, it is a lack of demand due in part, because of the limited number and type of telehealth services offered, and/or the perception that those services are of limited value in addressing health needs.

Virginia has invested time and resources to investigate the intersections between health needs, geographic location and broadband deployment in efforts to develop a business strategy that not only provides needed network infrastructure, but also creates the content and applications that health care providers' desire.

The Rural Health Care Pilot Program has provided Virginia the opportunity to not only address broadband deployment needs, but also to focus attention on important utilization and sustainment factors - key to ensuring that the FCC's investment can be leveraged. The Office of Telemedicine is proud to offer the FCC our business plan for improving infrastructure between rural healthcare providers and healthcare resources statewide, and creating incentives for healthcare providers to get connected!

2.0 STATEMENT OF NEED

Virginia will bring the benefits of telehealth services to those rural areas of Virginia where the need is greatest—starting with a focus on Stroke Systems of Care and related co-morbidities.

Introduction

Virginia ranks #21 in terms of overall health status in the United States according to the United Health Foundation America's Health Rankings (2006) report. While Virginia statistics seem “average” in comparison with other states, there are areas of Virginia where the health statistics are well below the national average. These areas include 23 counties in the Appalachian region-- representing nearly one third of all counties—and counties along the South side of the state and the Eastern Shore.

Similar to other states, Virginia's leading health problems are heart disease, diabetes, hypertension, obesity and stroke. What is unique about Virginia is its location within the “Stroke Belt” region of the United States known for the highest incidence and mortality of stroke in the country. In 2004, stroke was the third leading cause of death in Virginia and represented 7% of total Virginia deaths.

Virginia is a rural state with many small towns distributed across a diverse terrain. According to Census geographic area data, Virginia is comprised of 42,769 square miles; of which 31,602 square miles (73.9%) falls into the *Census definition of rural*. Virginia residents live in 134 localities (counties and independent cities). Half of the localities had a total population less than 25,000 people, including 38 localities with a total population less than 15,000 and 19 localities with a total population less than 10,000.

The Virginia Department of Health has documented the strong correlation between an individual's health status and their geographic location—in particular the relationship between rural areas and health disparities. Given this evidence, Virginia has decided to closely examine the patterns and geographic distribution of disease—particularly stroke -- and identify gaps in current systems of stroke care, as the basis for designing solutions.

Demographics

Virginia is the twelfth most populous state. 2006 population estimates from the Weldon Cooper Center for Public Service, the official numbers used by state and local government agencies across the Commonwealth in planning and budgeting, indicate that Virginia's population has reached 7.6 million people. Some other statistics about Virginia's population include:

- 51 percent are female, and 49 percent are male.
- 11.5 percent are 65 years and older.
- 72 percent are White, 19 percent are Black, less than one percent (0.5%) percent are American Indian and Alaska Native, 5 percent are Asian, less than one percent (0.5%) are Native Hawaiian and Other Pacific Islander, 2 percent are “other” race , and 2 percent reported more than one race (multiracial).
- Across all race groups, 6 percent were Hispanic or Latino origin.

Geography and Terrain

The Commonwealth of Virginia borders six states and the District of Columbia - West Virginia, Maryland, North Carolina, Tennessee, Kentucky and West Virginia. Virginia's long east-west axis means that metropolitan northern Virginia also lies as close to New York City and New England as to its own rural western panhandle. Conversely, Lee County, at the tip of the panhandle, is closer to eight other state capitals than it is to Richmond, Virginia's own capital. Virginia is organized into five geographic regions (see Figure 1). The western portion of the state is mountainous, covered by the Allegheny and Blue Ridge mountains with the great Shenandoah Valley falling between the ranges. The central piedmont region, with its rolling hills, flattens out into the sandy coastal plain toward the Atlantic Ocean.

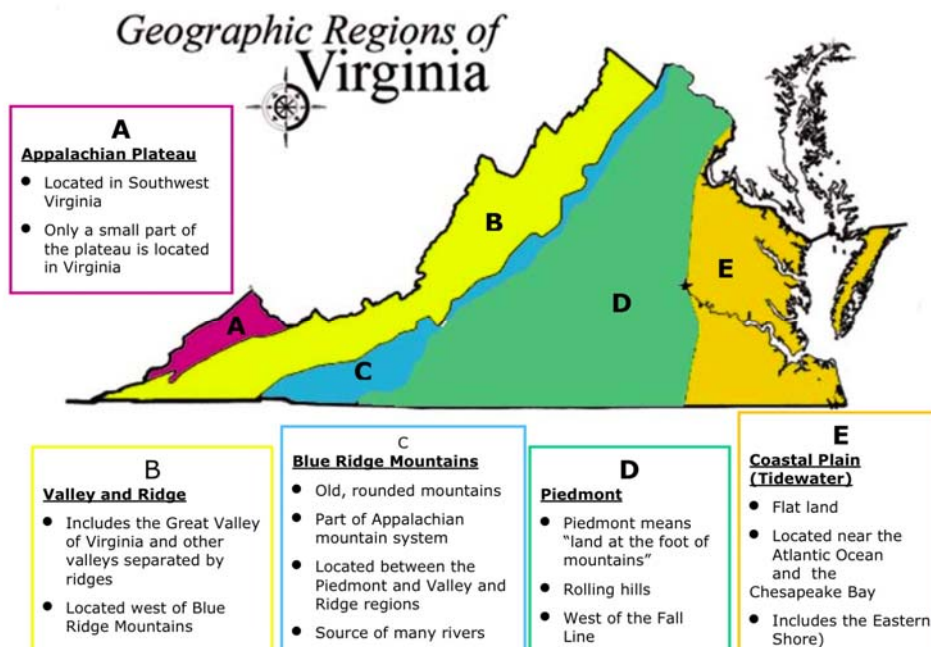


Figure 1 – Geographic Regions of Virginia

Access to Healthcare

The Census Bureau's Current Population Survey (CPS) data from March 2004 and 2005 estimate that 14% (or just over one million) Virginians are uninsured. Much like the U.S. as a whole, the Commonwealth's low-income population has one of the highest rates of uninsured. The proportion of families without health insurance living at or below 150% of the Federal Poverty Level (FPL) is close to or exceeds 20%. Fortunately, Virginia has a strong safety net system to deliver basic health care services for low-income, uninsured and geographically isolated individuals. Virginia's safety net providers include; 49 Free Clinics with 61 operating sites; the Virginia Primary Care Association's (VPCA) 26 member organizations operating 68 community health center service sites; 65 rural health clinics; 35 local health departments; and other providers committed to serving the underserved.

Nonetheless, 17.7% of all Virginians (over 1.3 million) live within a primary care health professional shortage area (HPSA). An HPSA is a geographic area, population group, or medical facility that has been designated by the Secretary of the Department of Health and Human Services as having a shortage of health professionals. There are HPSAs for primary health care (shortage of primary health care clinicians), dental health (shortage of dental health professionals), and mental health (shortage of mental health professionals).

Virginia has 53 primary care HPSA designations (47 geographic and 6 population group) in 66 counties and cities. There are also 49 health care facilities with HPSA designations, of which 22 are community health centers, 6 are rural health clinics and 21 are correctional centers. It is estimated that it would require an additional 105.7 FTE of primary care physicians in these institutions and areas to eliminate the primary care shortages that are currently being experienced within the Commonwealth's primary care HPSAs. The following are some key demographic statistics about Virginia's primary care HPSAs:

- Geographically, 47.3% of the Commonwealth (18,709 square miles) is within a primary care HPSA.
- 9.3% of all Virginia urban residents and 40.3% of all Virginia rural residents live within a primary care HPSA.
- 61.6% of all Virginia's primary care HPSA residents live within a rural area.
- 31.8% of all Blacks live within a primary care HPSA.
- 30.8% of all individuals below 100% of the Federal Poverty Level (FPL), which represent 9.6% of all Virginians, live within a primary care HPSA.

- 23.2% of all elderly (over age 65) live within a primary care HPSA.

Morbidity and Mortality

According to the Virginia Center for Health Statistics, cardiovascular disease was the leading cause of death among Virginians in 2003, accounting for 19,968 deaths. This was 34.5 percent of the total deaths (57,834) in the state that year. Cardiovascular disease (CVD) is a disorder of the heart (“cardio”) and blood vessels (“vascular”). CVD includes:

- Diseases of the heart-including ischemic heart disease, such as myocardial infarction (heart attack) and other heart diseases such as heart failure.
- Essential hypertension (high blood pressure) and hypertensive renal disease.
- Cerebrovascular disease (including stroke)
- Atherosclerosis, and
- Other diseases of the circulatory system, such as aortic aneurysm.

The Eastern Shore, southwest, southern and urban areas of the state (e.g., Portsmouth, Richmond City) have the highest CVD mortality rates. The northern Virginia areas tend to have the lowest mortality rates. These data tend to follow areas where other disparities lie, such as medically underserved designations or high rates of poverty.

The Commonwealth of Virginia lies in the “Stroke Belt” region of the United States. The Stroke Belt defines a region in the southeastern United States with the highest incidence and mortality of stroke in the country (1-4). In 2004, stroke was the third leading cause of death in Virginia and represented 7% of total Virginia deaths. The age-adjusted mortality rate for stroke in Virginia was 7.8 percent above the national stroke rate of 50 per 100,000 (as estimated by the National Center for Health Statistics). In particular, the African American stroke mortality rate remains one of the highest in the region and is growing through the southern states (5).

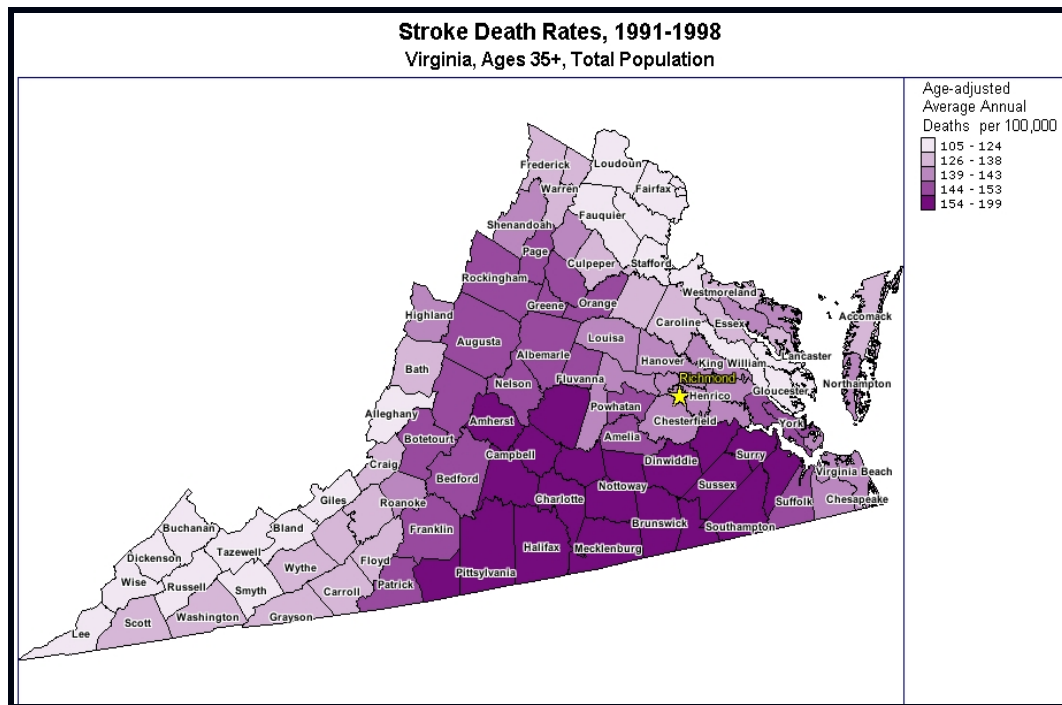


Figure 2 - Virginia Stroke Death Rates by County

There are several known risk factors and co-morbidities which can lead to stroke:

- Diabetes Mellitus
- Hypertension
- High blood cholesterol
- Overweight and obesity, physical inactivity
- Tobacco Use - in Virginia nearly 25 % of the population continues to use tobacco and use by young females is rising.

In Virginia, the counties that include the Appalachian Mountain Range (Figure 3) are known for exhibiting higher rates of heart disease and stroke mortality for all racial/ethnic, gender, and age groups.

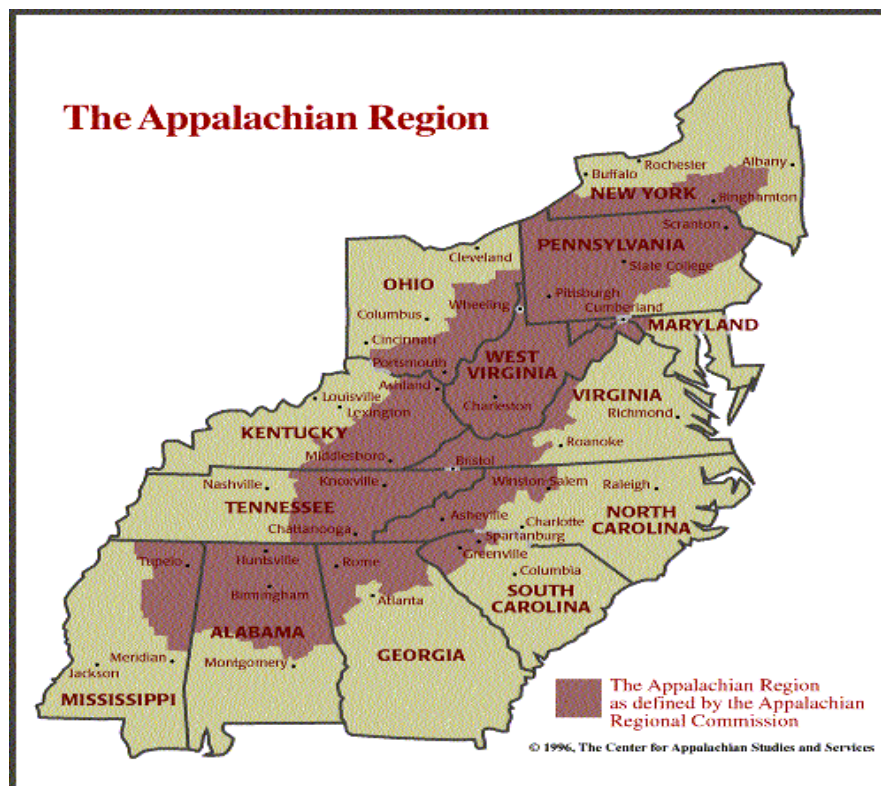


Figure 3 - Appalachian Region “Stroke Belt” (The Center for Appalachian Studies and Services)

This rural region of the Commonwealth suffers from poor health status and significant shortages of specialty healthcare providers-- including neurologists who diagnose and treat stroke patients. (See Figure 4).

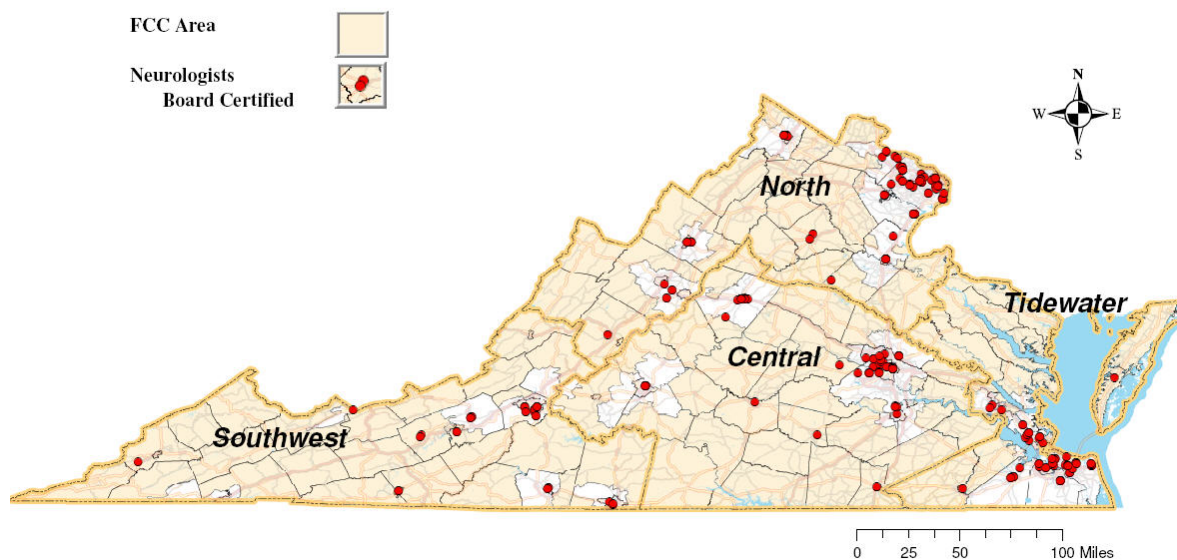


Figure 4 - Board-certified Neurologist in the State of Virginia by Regions

Representation from these regions is poor in professional societies such as the Virginia Neurological Society (1% of total members) and the American Academy of Neurology (~4% of total members). This suggests increased professional isolation with diminished resources for professional development and intellectual exchange on stroke care issues. Coupled with high rates of uninsured citizens and overall poor health status indicators, many patients fail to receive the requisite preventive health care services, patient education and interventions required to reduce the burden of stroke.

A FOCUS ON STROKE SYSTEMS OF CARE

In 2006, approximately 14,000 patients with the final diagnosis of TIA or stroke were discharged from the 85 hospitals treating stroke in the state (VDH 2004 statistics). The American Stroke Association (2006) reports a financial burden of \$58 billion from morbidity and disability from stroke. In Virginia, total charges for inpatient stroke care were over \$567 million. The additional burden of long-term disability is comparable. Given the magnitude of the stroke burden, Virginia has decided to focus on a review of stroke systems of care to identify areas where improvements can be made.

Early Recognition and Treatment

A stroke, or cerebral infarction, occurs due to a (usually abrupt) cessation of blood flow to the brain, starving the brain of oxygen and glucose. Due to its high demand for energy, the brain tissue dies within minutes. Depending on several factors—location within the brain, duration of diminished or absent blood flow, and length of time passed until treatment is rendered—a stroke can produce mild to severe disability or even death. Strokes may be ischemic (insufficient blood flow) or hemorrhagic (due to bleeding within the brain) in nature.

In 1995, the Federal Drug Administration (FDA) approved a drug called “tissue plasminogen activator” or t-PA for treatment of an acute stroke secondary to ischemia. The window of opportunity to administer this drug is very limited. Patients must receive an infusion in an emergency room, within 3 hours of the onset of the stroke. Beyond that time, this drug can actually have negative effects. Thrombolytic agents must NOT be given to patients with a hemorrhagic stroke which would worsen the central nervous systems findings, hence the necessity for accurate and timely diagnosis and therapy. This requires rapidly obtaining a brain scan (“head CT) prior to infusing the drug. Many smaller community hospitals may not have the capacity to maintain either the CT scanner or the 24/7 technical staffing needed.

If a patient, or a nearby bystander, does not recognize the signs and symptoms of stroke quickly the window of opportunity to receive t-PA closes. Therefore, it is critical that stroke be detected early, that

emergency services are notified quickly, and that patients are transported to the closest emergency room for evaluation, diagnosis and treatment. Due to Virginia's diverse topography, there are many transportation challenges for acute health needs requiring emergency medical services and rapid travel to tertiary care hospitals.

In 2004, the National Institutes of Health (NIH) established the Coverdell National Stroke Registry in four states with the mission of monitoring and improving the quality of acute stroke care. Initial results indicated large discrepancies between recommended treatment guidelines and actual emergency medical service (EMS) and hospital practices (6). Although Virginia is making strides to improve stroke systems of care, there is still evidence that stroke care is sub-optimal. Below are recent data that illustrate issues related to the delivery of state of the art acute stroke care in Virginia.

Time to Care

The Joint Commission recognizes centers that make exceptional efforts to foster better outcomes for stroke care through Primary Stroke Center (PSC) certification. Adjacency and time to a PSC is important to assure optimal care, including ability to be diagnosed rapidly and receive t-PA in the case of Acute Ischemic Stroke (AIS).

- Of the total Virginia population of 7.6 million in 2006:
 - 55% resided in zip codes within a 30 minute drive times of a PSC
 - 76% resided in zip codes within a 60 minute drive time of a PSC
 - 24% resided in zip codes more than a 120 minute drive to the nearest PSC.

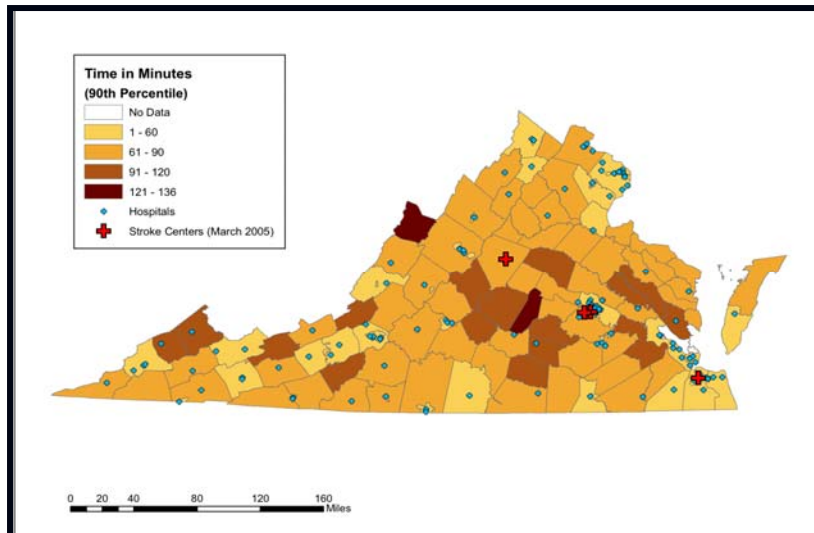


Figure 5 - EMS Call times for Potential Strokes (2003-2006)

A recent evaluation of Virginia EMS incidence reports indicates there is a significant (approximately 20%) increase in call time in underserved regions of Virginia compared to those in non-underserved regions (7).

			Call Time (Minutes)			
	Population	Strokes	Mean	SD	% (50th)	% (90th)
Non-Underserved	5981866	7749	41.9	16.5	38	64
Underserved	1092360	1844	51.1	26.5	49	79
TOTAL	7074226	9593	43.6	19.2	40	67

Table 1 - Virginia EMS Call Time (Minutes) – 2003-2006

Use of t-PA

Acute Ischemic Stroke (AIS) represents a significant (51%) proportion of total strokes in Virginia. Until the Centers for Medicare and Medicaid Services (CMS) reimbursement enhancement for treatment of AIS with t-PA (ICD-9 Procedure Code 99.10), the use rate in Virginia was 0.5%, which is below the national rate (2-5%) and far below the rate that some regions have achieved (20%). Beginning in October 2005, the time of the CMS reimbursement change, the t-PA use rate grew in Virginia to about 1.7%.

- Most of the use and growth in use of t-PA occurred in Primary Stroke Centers (4% t-PA use rate by September 2006) which are located in the central, northern and eastern portions of the state, with no service for populations residing in southwestern and southside Virginia.
- African American, female and patients over age 80 were less likely to receive t-PA than other races, men and patients under age 80

ORGANIZATION OF VIRGINIA'S STROKE SYSTEM

In 2005, the Virginia Department of Health (VDH) partnered with the American Stroke Association (Mid-Atlantic Division) to form the Virginia Stroke Systems Task Force. One of the main goals of the Task Force was to rectify stroke care disparities by supporting a comprehensive project to strengthen the systems of care for stroke patients in Virginia. Meetings with stroke healthcare providers were convened to evaluate the state of stroke care. A team of experts was assembled and a comprehensive system-wide work plan was finalized (see Appendix E) to address each of the six core components of stroke care (Figure 6).

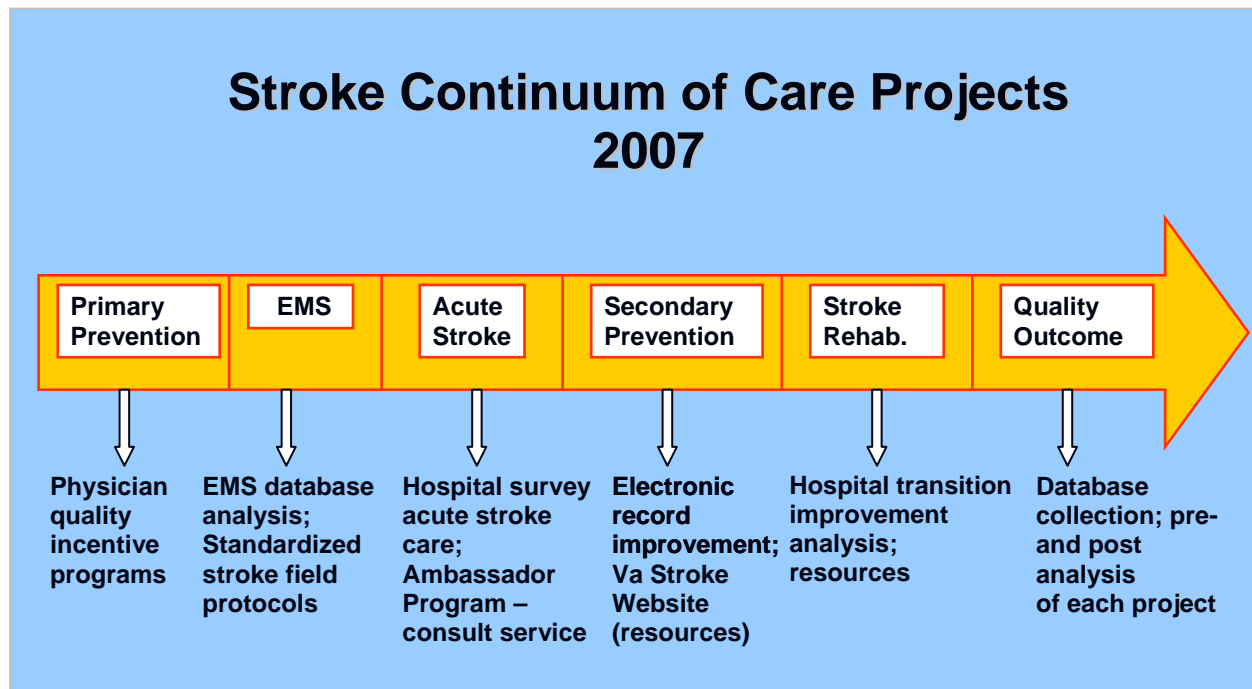


Figure 6 - The Stroke Continuum of Care Indicating the Importance of an Integrated Approach.

To assess acute stroke care, data was voluntarily submitted by 82 hospitals that had patients discharged with a primary diagnosis of stroke. Based on standardized evaluation criteria, each hospital was assigned a designation within the stroke system which matched their capabilities to deliver stroke care:

- Level 1- Comprehensive Stroke Center- highest level of capabilities, cutting-edge technologies/treatments
- Level 2- Primary Stroke Center- (based on Joint Commission Accreditation of Healthcare Organizations criteria)
- Level 3- Basic Stroke Care
- Level 4- Initial Entry Level Care- usually a very small facility with a low stroke volume and unable to support a full stroke program, but can triage patients and transport to a facility with greater capabilities.

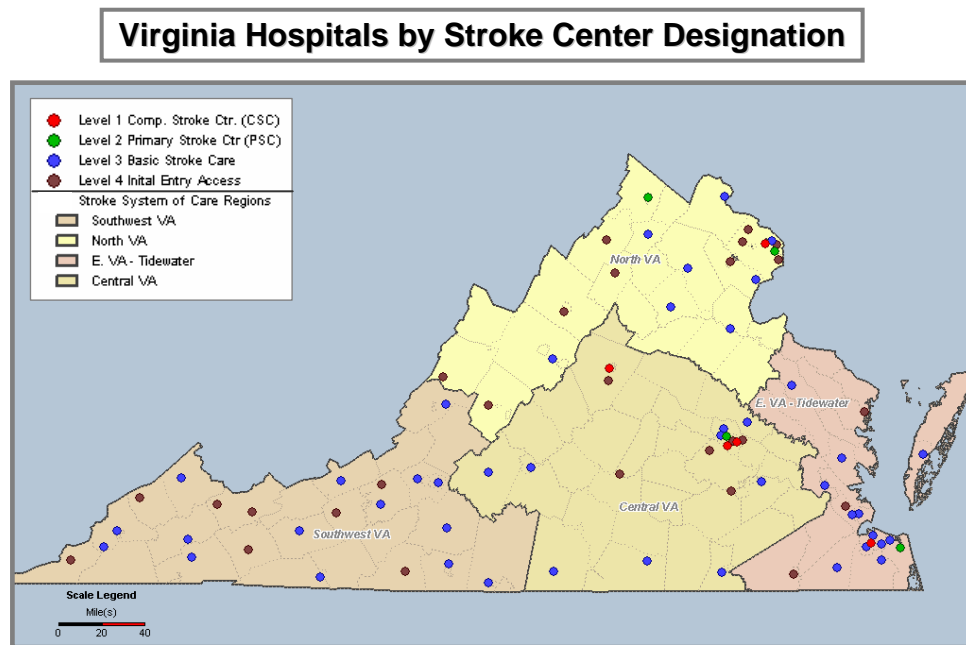


Figure 7 - Map of Virginia Acute Care Hospitals Based on Stroke Care Capabilities

Today, Virginia's Stroke Task Force is implementing the *Recommendations for the Establishment of Stroke Systems of Care* (8) through a statewide program administered in part through VDH and the American Stroke Association. The VDH Virginia Heart Disease and Stroke Prevention Project is one of eleven funded by the Centers for Disease Control and Prevention (See Figure 8). This critical program provides statewide basic patient education for primary and secondary prevention of stroke (treatment before and after the stroke) and supports physicians' education as well.

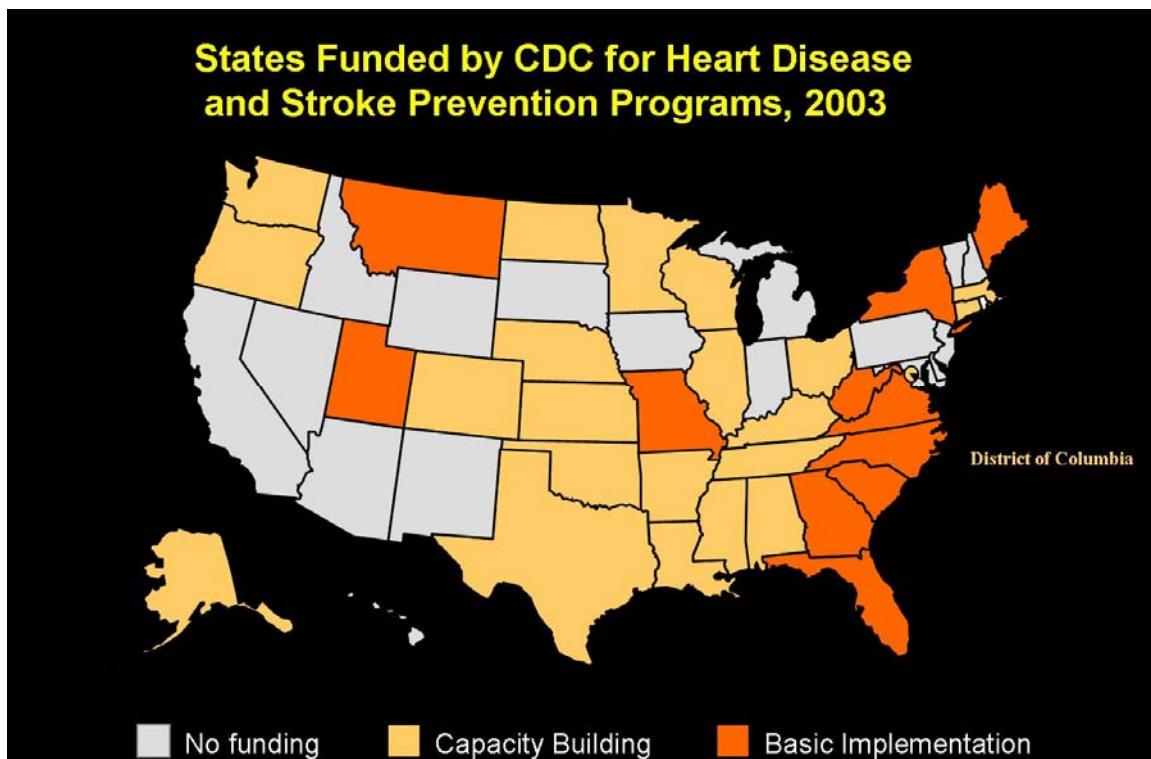


Figure 8 - CDC Funded Heart Disease and Stroke Prevention Programs, 2003

National guidelines recommend that a well-coordinated stroke system should promote *patient access to the full range of services through the continuum of care associated with stroke prevention, treatment and rehabilitation*. Therefore, initial targeted interventions include:

- Public awareness of the signs and symptoms of stroke
- Acute stroke treatment by first-responders and emergency room personnel
- Continuity of care between hospitals, rehabilitation centers and primary care providers

Efforts are now underway to design innovative strategies for improving stroke systems of care in Virginia. There are presently over 30 different programs throughout the stroke continuum of care. Highlights include the development of a Virginia Stroke Systems of Care stroke resources website and the launch of the Virginia Stroke Ambassador Program which is a forum of stroke experts who answer questions on stroke systems development (such as how to start building a Primary Stroke Center). In addition to these programs, the Virginia Stroke Systems Task Force would like to do more to reach rural and underserved areas of Virginia.

VIRGINIA'S SOLUTIONS

Virginia has documented that inadequate distribution of health resources along with geographic isolation, result in health disparities and poor health status for those living in rural and/or underserved areas. Some of the heaviest burdens appear to be in the Appalachian region with known poverty, lack of health insurance and physician shortages all contributing to poor overall cardiovascular and stroke care.

In reviewing stroke systems of care it is apparent that there are opportunities to make improvements in early detection, diagnosis and treatment of acute stroke. Specifically, there are geographical and professional barriers to accessing the expertise of primary stroke centers and significant underutilization of t-PA.

Recognizing these critical issues, the Virginia Stroke Systems Task Force has begun establishing programs to rectify these health care disparities and is looking for ways to better integrate technology into mainstream health systems. UVA and its partners are working with the Virginia Stroke Systems Task Force to develop solutions.

It is well known that information and telecommunications technologies (ICT) are being used today to support the management of health care. The use of ICT to electronically distribute healthcare data (text, images, voice and video) between healthcare providers, and between providers and patients to support the delivery of health care services and education is called *telehealth*. Broad in scope, it includes all stakeholders within a health care system as participants. Doctors, nurses, therapists, health educators etc, can all work with each other, and with their patients, regionally or on a statewide basis. Digital images and patient health data can be distributed over telecommunications networks at great distances to facilitate remote monitoring, diagnostic evaluation and consultation. Furthermore, telehealth applications can be used to deliver patient and provider education within healthcare institutions or even to their homes.

While UVA and other academic medical centers are providing remote specialty consultation and tele-radiology services, there is no particular focus on telehealth applications for stroke care within these existing telehealth programs or at the state level. The consensus is that this would be an excellent starting point for designing a telehealth network. In particular, a statewide telehealth network could significantly strengthen existing interventions by providing new alternatives to delivering stroke services to needy Virginians.

3.0 VIRGINIA ACUTE STROKE TELEHEALTH (VAST) NETWORK

Virginia will leverage the successes of existing acute stroke intervention programs and implement a multifaceted strategy that utilizes communication networks and telehealth applications to make improvements in stroke systems of care.

Acute stroke and the subsequent morbidities and mortality associated with stroke create a serious burden on America's health system, and in particular, in the Commonwealth of Virginia. With the aging of our population, and the significant increase in the incidence of the major co-morbidities and risk factors of stroke – diabetes, obesity, and hypertension – we are compelled to implement strategies to reverse this trend and provide timely state of the art care for our citizens.

While there is no one single solution to reducing the incidence of stroke or its complications, coordinated efforts amongst health care systems can make considerable impact through the design and implementation of innovative interventions leveraging telecommunications and information technology capabilities.

Telehealth/Telemedicine has been shown to effectively facilitate interventions that reduce the morbidity and mortality of stroke. States such as California, Georgia, Maryland, Massachusetts and Texas have well-established programs to facilitate the treatment of acute stroke and thereby mitigate its complications (9-16). Through video-based remote teleconsultation, the transmission of CT scans using teleradiology, and online exchange of medical records supported by real time consultation, highly-trained physicians at major stroke centers are able to share their expertise with other medical facilities. By leveraging this remote expertise, these outlying medical facilities with fewer local capabilities can be enabled to rapidly diagnose a stroke, and administer drugs, such as t-PA, within 3 hours of stroke onset, and significantly reduce the devastating effects of brain ischemia. In these states, this outreach capability is putting definitive stroke care within effective reach of greater numbers of our rural and underserved Americans.

In conjunction with this proposal, Virginia will leverage the successes of these other acute stroke intervention programs by implementing a multifaceted strategy that utilizes communication networks and telehealth applications to make improvements in stroke systems of care.

Operational Design of VAST

The FCC Rural Healthcare Pilot will fund the overlay of a telehealth network, on top of, the organizational structure of the Virginia Stroke System described in Section 2- Figure 7. The initial design is based on the classic telehealth hub-spoke configuration whereby the hospitals with the most advanced

stroke capabilities will serve as the “Hub”, offering telehealth services to remote or smaller hospitals with lesser capabilities called “spokes”. While the hub-spoke model will be the initial design, the goal is to modify the design as sites develop increasing capabilities. This means that a site might serve as a Hub and a Spoke under some circumstances.

The implementation and build-out of the tiered hub-spoke configuration of VAST will be done in phases. In Phase 1, Virginia’s academic medical centers-- currently identified as both Comprehensive Stroke Centers (CSC-Level 1-VAST Tier 1) and Primary Stroke Centers (PSCs Level 2-VAST Tier 2) will be linked to each other. In Phase 2, as the PSCs are trained in tele-stroke practices and establish direct business relationships and connections with Tier 3, services will be extended out to basic and entry-level stroke hospitals, critical access hospitals, and community health centers in rural and underserved communities.

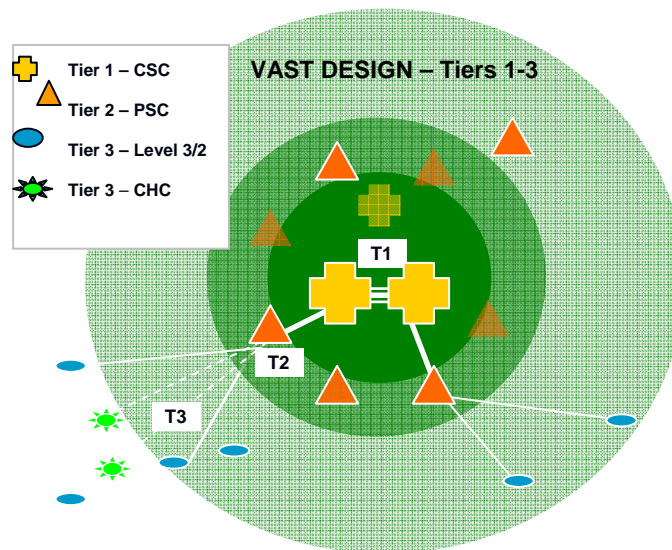


Figure 9 - VAST Hub-spoke design: Tier 1

Comprehensive Stroke Centers, Tier 2-Primary Stroke Centers, Tier 3’s- Basic and Entry Level Hospitals and Community Health Centers

Site Selection

For purposes of the FCC Pilot, a total of 40 sites (with possibly 8 others- See Section 5) were selected for the initial planning and implementation phase. Eligible rural and urban providers have been selected with an emphasis placed on Critical Access Hospitals-- defined as a rural limited service hospital that has been converted to a special designation as a Critical Access Hospital under the Medicare Rural Hospital Flexibility Grant Program. The majority of CAHs are in Health Professional Shortage Areas and/or Medically Underserved Areas.

For the initial phase, hospitals and community health centers have been selected to participate in VAST. It is envisioned that services will be extended into other care environments over time (outside scope of FCC) to include; ambulances and medevac helicopters, doctor's offices, nursing homes, rehabilitation centers and patient homes to complete the VAST network.

Breakdown (See Appendix A –for the VAST Network Site List with RUCA Codes)

- Level 1/Level 2 - Comprehensive Stroke Centers: 5
- Level 3: 11 sites
- Level 4: 11 sites
- Community Health Centers: 13 rural-weighted, distributed within a close proximity and with an affiliation with a Level 3 or Level 4 hospital.

The majority of sites, 70%, were deemed “rural” by FCC criteria, and 100% were of non-profit status. Regional distribution reflected an emphasis on rural counties, with 35% of the sites in the southwest, 29% central, 20% north and 16% on the Eastern Shore of Virginia.

Virginia Hospitals by Stroke Center Designation

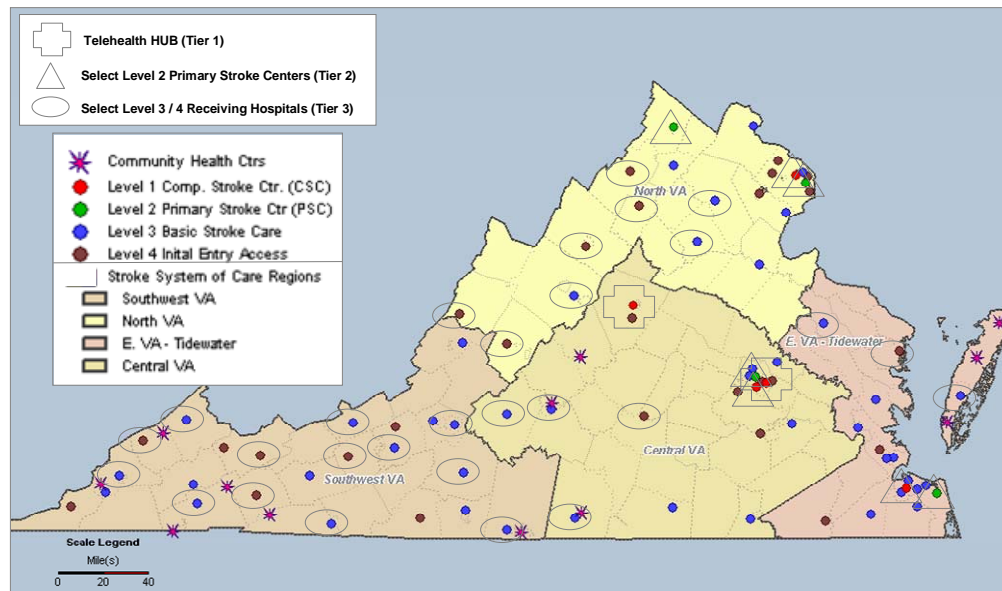


Figure 10 - VAST Clinical Network Design

Telehealth Applications for Stroke Systems

Using the stroke continuum of care depicted below, Virginia will design telehealth applications aimed at all phases of the continuum in efforts to optimize the entire stroke system of care.

While some phases of the continuum include ineligible providers under FCC rules, they are described here for completeness in describing the larger utilization strategy for the VAST network.



Figure 11 - Stroke Continuum of Care and Associated Telehealth Applications

An array of telehealth applications will be introduced to complement existing traditional stroke interventions. While Tele-Stroke programs in other states focused specifically on the acute treatment portion of the stroke continuum, Virginia intends to take a more comprehensive and integrated approach.

Specifically, intensive interventions will be focused on those areas of the continuum that are linked to factors associated with that under utilization of stroke care systems which include:

- Poor patient recognition of stroke symptoms
- Delayed notification of emergency services
- Delays in patient transport

1. Prevention

Education & Training

Unfortunately, most Americans learn what the term “stroke” means by directly experiencing the devastating effects themselves, or by witnessing the effects on someone they care for. Stroke awareness messages can be reinforced through a range of educational applications which will be offered on the internet and/or by video-conferencing in community-based settings.

Health care professionals and first-responders also can benefit from continuing medical education addressing acute stroke recognition and treatment. A range of educational opportunities can be provided remotely to include: web-based training; broadcasting of interactive classes state-wide; collaborative neurovascular conferences and grand-rounds; and supervision and training of medical students and residents using video-conferencing equipment.

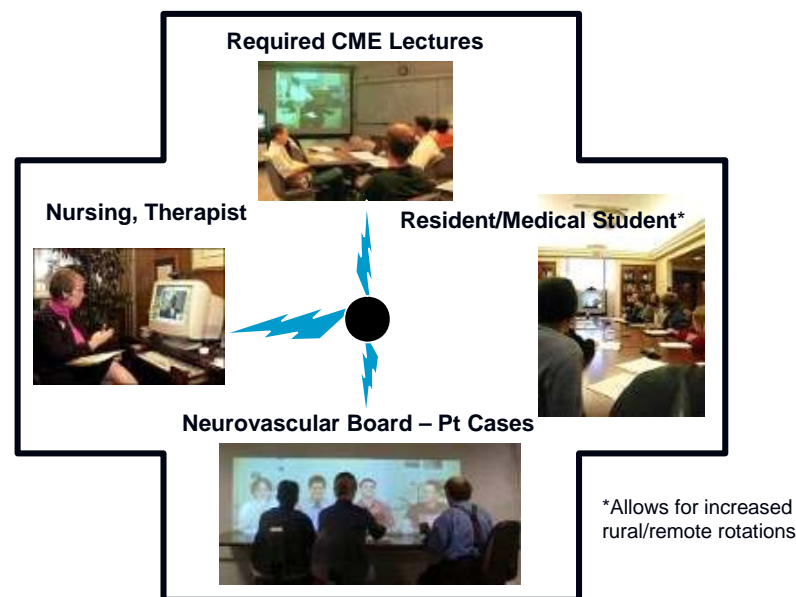


Figure 12 – Virtual Training and Education

Remote Medical Teleconsultation

There is a need for primary care providers (PCPs) to have access to medical specialists for remote consultation for assistance with diagnosing conditions and developing treatment plans. The three specialties which are most often consulting for stroke and related co-morbidities include:

- Endocrinology (diabetes, obesity)
- Cardiology (heart disease, high blood pressure and high cholesterol)
- Neurology (stroke)

PCPs can either interact with specialists via live video or by using secure email or web-based store-forward consultation systems. In addition to provider-to-provider consultation, patients can also be scheduled for a specialty consultation and have face-to-face visits using video-conferencing equipment. Their electronic health and laboratory data can be provided in advance or transmitted in real-time to facilitate the encounter.

Counseling

There are many types of individual and group counseling and patient education sessions that can be conducted remotely. For example, there is a severe shortage of diabetic educators and dieticians in Virginia. The existing model of broadcasting diabetes patient education, as has been deployed by the University of Virginia, can be expanded to serve patients throughout the Commonwealth.

2. Emergency Medical Services (EMS)

Currently this portion of the continuum of acute stroke intervention is not funded by the FCC Rural Health Care Pilot Program or the existing Rural Healthcare Support Mechanism. Ambulances and EMS facilities are not eligible providers. However, there are telehealth applications which could be implemented if broadband wireless connectivity were provided to every ambulance and helicopter. Given the duration of transport in some locations, first-responders/paramedics could connect with emergency departments to transmit vital signs and enable remote video-monitoring and physical inspection of patients in the pre-hospital setting by emergency room physicians located at Comprehensive and Primary Stroke Centers.

3. Acute Treatment.

A majority of the telehealth/telemedicine interventions initially will be focused in this element of the continuum. There are three main applications which will be used in combination to provide a total solution for acute stroke care. Following the Tele-stroke models from other states, three key applications will be used:

- **Live Video-Teleconsultation**
 - Physicians at a Primary Stroke Center will consult via video with remote Emergency Department personnel to provide diagnostic support during the initial triage and treatment of a suspected stroke patient. Stroke Center experts can visually inspect patients to look for signs and symptoms of stroke and work virtually side by side with health care providers to deliver timely care.
- **Tele-radiology**
 - Transmission of CT scans from one facility to another
- **Web-based applications**
 - Electronic health record for stroke care with standardized protocols and order sets.



Michigan Stroke Network linking 22 rural hospitals with St. Joseph Mercy Oakland Hospital (Pontiac, MI)



Partners Health Care, Boston, MNA (Massachusetts General and Brigham and Women's) are linked to 14 rural sites.

Figure 13 - Tele-Stroke Model Programs

4. Sub-acute & Secondary Prevention

After a stroke has occurred, complications can follow. Experts can continue to observe and consult with patients and their physicians until discharge.



Figure 14 - Loma Linda Medical Center – Inpatient/ER Telemedicine Services

As evaluated in a recent NIH-sponsored trial, and in other studies, the transition from hospital to home is a high-risk period in a patient's illness (18-19). After discharge, patients either return home under the care of the primary care physician, or are transferred to a rehabilitation center. Either way, telehealth applications will ensure continuity of care and continued consultation and follow-up visits with healthcare

professionals regarding medications and on-going care. Further, telehealth applications can ensure the timely and accurate flow of information to the primary care physician at the time of patient discharge.



Figure 15 - Tele-Home Care for Patients After Stroke.

As noted by the Agency for Healthcare Research and Quality (AHRQ), “any process that improves information transfer among providers at discharge might improve the health and safety of patient discharged from US hospitals each year” (20).

5. Rehabilitation

If patients are transferred to a skilled nursing facility or other center for further care and rehabilitation, telehealth applications can aid in that transition by ensuring communications between the health care teams to ensure a smooth hand-off and coordination of care.

6. Continuous Quality Improvement

Healthcare providers will be using a range of software and hardware to conduct telehealth services. Likewise, they will be using protocols and procedures for conducting telehealth and telemedicine applications. The use of equipment and the associated clinical business practices and conduct on the network will need continuous monitoring and evaluation. State-wide meetings can be held at a distance to facilitate peer-review, supervision of practices and to conduct in-services and ongoing equipment training to ensure standards of care.

Technical Design

The following graphic provides a high-level technical view of the VAST network. Equipment for the hub and spoke sites is illustrated as well as the broadband connection that enables telehealth applications to operate.

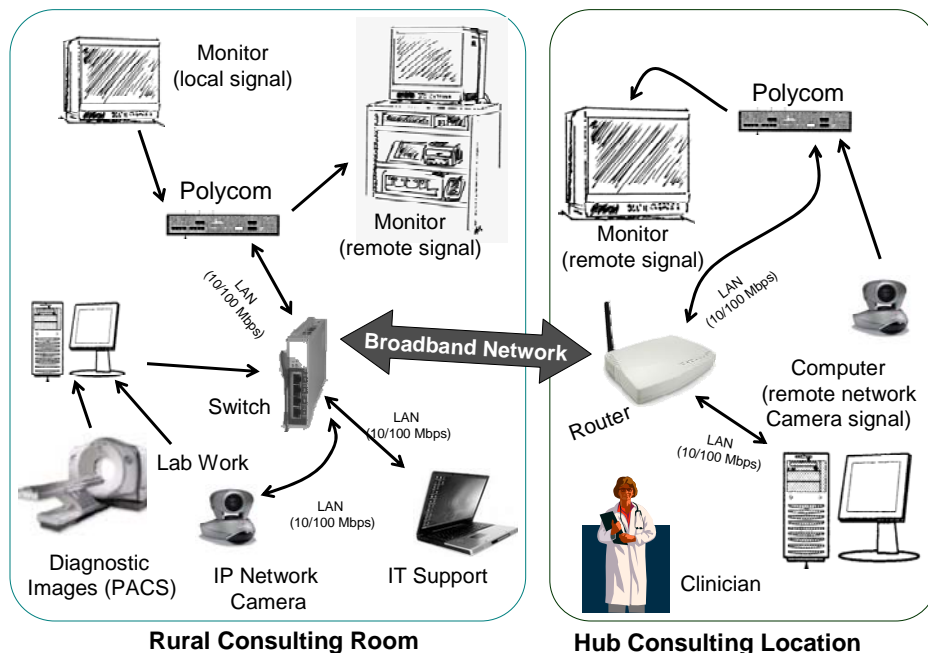


Figure 16 - Technical View of the VAST Network

This section described the operational architecture and telehealth applications of the VAST Network. Given the current state of stroke care, and the likelihood of major advancements in stroke therapies on the horizon, it is urgent that measures be taken to create mechanisms for connecting patients to stroke systems of care— from ANY location in Virginia—for rapid identification, assessment and treatment. Further, health care providers must be trained on best practices and the latest treatments in order to ensure that care is delivered effectively once a patient enters the stroke system.

An enabling technological and telecommunications infrastructure that provides the capabilities to remotely educate and train health professionals and diagnose and treat stroke will significantly mitigate the widespread disparities in rural and underserved communities in Virginia. The following section will discuss the technical approach to the telecommunications network that will support VAST.

4.0 NETWORK PLAN

Virginia will adopt a forward-thinking design for the Virginia Acute Stroke Telehealth (VAST) network; not only deploying an advanced telehealth network, but also developing a unique “best practices” model with demonstrable and quantifiable results that can be replicated by other States.

Virginia has thoughtfully designed a network that facilitates the clinical business goals and objectives of VAST, meets the functional and technical requirements laid out by the Virginia Telehealth Network, and leverages legacy and advancing telecommunications infrastructure. The network strategy takes two approaches to exploring long-term solutions for healthcare users—a migration strategy from ATM to MPLS that is operated and managed by a dedicated Telehealth Network Operations Center (NOC) at UVA, and a direct connection to the state’s new MPLS network managed by Northrop Grumman.

Virginia Telehealth Network

Virginia has been collaborating on telehealth activities at a state-level for the past 4 years. First conceived in 2002, the Virginia Telehealth Network—a collaborative network of professionals—began exploring ways to address health needs through the use of telehealth and telemedicine applications. To date, organizational development of the VTN has been pursued and championed through the interests and active participation of organizations and individuals throughout the Commonwealth, including:

- Academic medical centers
- State organizations involved with health care
- State and local government entities
- Regional organizations involved with health care
- Colleges, universities and foundations
- Health care professionals

Currently, the VTN represents more than 80 organizations from throughout the Commonwealth who have the desire and ingenuity to make quality health care accessible to more Virginians. Acting as their collective voice, the VTN helps set a direction and standards for not only establishing user connectivity, but for the processes and content that ultimately drive telehealth acceptance and usability by both health care providers and patients alike.

During its developmental stages, the VTN operated under the auspices of the Virginia Department of Health (VDH). Through the ongoing, strong support of senior government and healthcare leaders and through the dedication of its grass-roots membership, in 2006 the VTN became an independent corporation in the Commonwealth of Virginia. The VTN is now in the process of being recognized as a 501(c)(3) not-for-profit organization to demonstrate and facilitate its alignment with public interests.

Developing Functional and Technical Requirements

Recognizing the essential role that affordable infrastructure plays in the successful deployment of telehealth/telemedicine applications, in 2003- 2004 the VTN formed an Infrastructure Work Group (IWG) to assess the current telehealth infrastructure and capacity, and develop future plans for expansion of telehealth activities. Based on the findings of the site survey, a white paper was developed by the VTN IWG recommending the “**development of an integrated statewide telehealth network infrastructure and organization designed to meet the present and future needs of all VTN members**”. In September 2005, a Strategic Planning Team was formed to identify the high-level system requirements for the network recommended by the VTN IWG with the idea that the VTN would itself stand-up and operate a dedicated telehealth network to provide customized support for those accessing telehealth services. Core recommendations for the telehealth network included:

The Telehealth Network shall;

- Supply Internet Protocol (IP) based MultiProtocol Label Switching (MPLS) services, utilizing existing telecommunication network facilities.
- Be available to all public and private healthcare related organizations and individuals.
- Provide a flexible, scalable, manageable, secure and cost-effective network infrastructure capable of linking healthcare providers and patients within Virginia, as well as nationally and internationally.
- Provide 24/7 access to technical assistance for interconnectivity problems that have in the past created obstacles to the adoption of telehealth services.
- Provide a comprehensive means in Virginia to ensure full-scale interactive broadcast messaging to health service providers in times of public health emergencies.
- Provide the necessary infrastructure for patient health record exchanges.

In fall 2006, the VTN IWG requested that VTN assemble a clinical work group to define the specific functional requirements of the developing state-wide telehealth network. It was during the period that the

clinical work group was conducting research and formulating recommendations that the FCC Rural Healthcare Pilot Program was released. At that time, it was decided that the Virginia Acute Stroke-Telehealth (VAST) Model would be the focus of the Commonwealth's FCC application and serve as an initial organizing framework for the development of telehealth functional requirements. Following are the high-level functional requirements for the initial implementation of the VAST network.

The VAST network shall:

- Provide a ubiquitous network linking Level 3 and Level 4 Stroke Centers to each other, to allow the seamless flow of medical data and images to and from all nodes on the network statewide.
- Transmit a diagnostic-quality radiology image (CT scan- averaging 70MB) between designated stroke centers within 15 minutes to support the delivery of acute stroke diagnosis.
- Support the concurrent utilization of four main data formats for purposes of delivering high-quality medical care; 1) radiology, 2) High Definition video-teleconferencing, 3) Web-based applications and 4) voice.
- Provide a platform through which rural facilities have affordable access to the advanced research and computing resources and capabilities available on Internet2 and National Lambda Rail networks.

The pioneering activities of the VTN have provided a strong technical and clinical base upon which the VAST proposal now stands. By coalescing stakeholders and providers the VTN has developed the requisite state-wide partnerships for coordinating telehealth services that can be leveraged to insure the success and sustainability of the VAST Network. Furthermore, the early efforts to document and validate functional and technical requirements, has set the stage for the initial network design.

Approach

Since the VTN IWG made its initial recommendations, the telecommunications industry has undergone rapid change – both in technology advancements and in areas served. In keeping pace with the industry, the Commonwealth of Virginia has also evolved its networking and service capabilities, resulting in a very different landscape than initially examined and documented by the VTN. These factors lead the UVA team to conduct a careful review of the existing and planned state infrastructure so that the proposed VAST network could be designed in a manner that will allow for maximum usage of existing/planned infrastructure rather than spend dollars on “overbuilding”. Existing infrastructure to be leveraged by VAST includes: two existing state networks (Network Virginia, COVANET), open access

networks funded by the Virginia Tobacco Commission, and the emerging Commonwealth/Northrop Grumman MPLS network. Detail on each of the legacy networks can be found in Appendix F. Further discussion regarding the status of the State's transformation efforts is provided in Section F as well.

The Future – Commonwealth Network Transformation

As part of a 10-year, technology transformation partnership between the Commonwealth of Virginia and an industry team led by Northrop Grumman Corporation, the Commonwealth is working to build a single, statewide managed network to support all government services. Through a multi-million dollar investment, the state will migrate from network technology that is fragmented and inconsistent among state agencies, and reduce from 85 inconsistent internet connections to two consolidated, secure, and reliable connections with one centralized multi-service network. The new statewide network will be more robust, reliable and secure. The network transformation is occurring with the introduction of Multiprotocol Label Switched (MPLS)¹ which provides an expandable extensible fabric, allowing for a tighter integration among and between the services as well as allowing Commonwealth agencies to more seamlessly integrate support services across all levels of government throughout Virginia.

Upon completion, the new MPLS managed network will support over 1,900 locations throughout Virginia (Figure 19), managed by two state-of-the-art operations centers located in different regions of the state, and support all government operations, including human services, health solutions, public safety, transportation, and other key citizen support services.

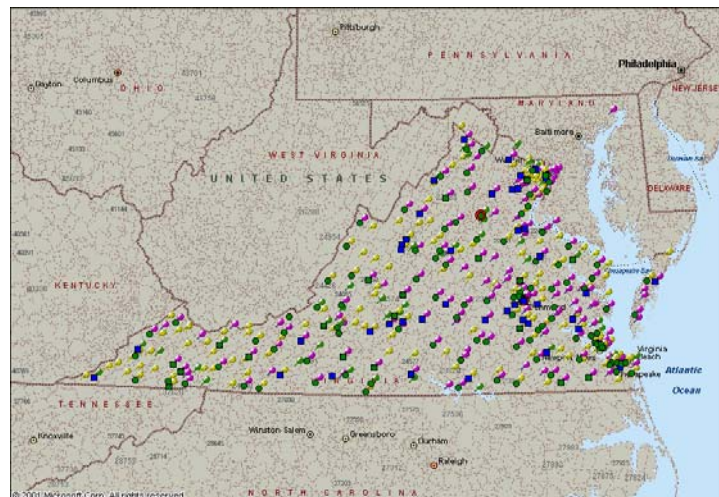


Figure 17 - COVANET Today and MPLS Network by 12/31/08

¹ Access to an MPLS is not restricted to Northrop Grumman. Verizon (as well as other providers) are capable of/are deploying similar applications in Virginia. Verizon and Virginia Tech will be partnering with VAST to provide access to their MPLS solution

How Do We Get There - Transformation Efforts Underway

In 2005, The Commonwealth of Virginia and Northrop Grumman formed a partnership to modernize the state's information technology infrastructure. Called the Virginia IT Infrastructure Partnership (ITIP) the partnership is tasked with providing innovative ideas to meet the needs of the Commonwealth. Through the ITIP, state government agencies, regardless of size and budget, are provided expanded offerings and reliable services at predictable prices as a result of the partnership's enterprise and integrated approach to IT service delivery. This technology transformation is being accomplished without additional cost to taxpayers through a \$270M investment from Northrop Grumman.

The three-year transformation process that began July 1, 2006, will bring a reliable, high-performance and enterprise-wide IT infrastructure to the Commonwealth. Transformation will mean that state agencies receive consistent, reliable and measurable services. Transformation projects include (but are not limited to): desktop refreshes with compatible platforms and scheduled replacement; network and server modernization and consolidation; enhancement of information security; common messaging, and help desk services. See Figure 18 for a conceptual view of the MPLS network transformation.

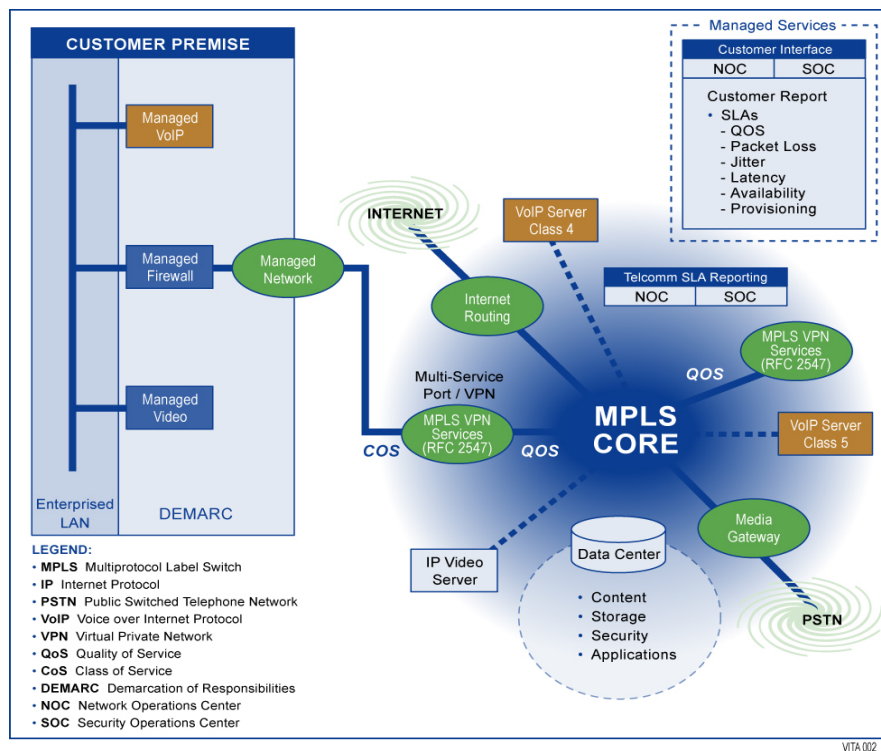


Figure 18 - Virginia's Integrated MPLS VPN Architecture

Ultimately the Commonwealth (through the ITIP and the consolidated network) will be able to support the two new data centers and integrate all network services through common multiservice ports. The bottom line for the Commonwealth is that this single MPLS network will reduce cost, enhance functionality, and simplify operations.

Status of the MPLS Roll-out

At the time of submission, the core network is complete. Further implementation is underway using a phase-approach with 15% of the targeted sites being migrated to the state's MPLS network per quarter. The roll-out is not agency based, but is being done on a regional basis, with a goal of having all 1900 sites transitioned by 2009. Presently, the Virginia Department of Health sites, and other healthcare-related organizations have not migrated.

All of the legacy and future networks have been examined and considered during the development of the proposed VAST network. Each will play a critical role in the successful deployment of the VAST infrastructure, and because of the different types of broadband technologies available, will allow for the testing of different configurations and cost models that once optimized can ultimately serve as a customizable and replicable model for others to follow.

Considerations

Early in the design process, the team believed that a complete migration of the participating VAST sites to the state's MPLS network would be the most desirable solution. However, after close examination, the following factors, deemed a complete cut-over to be the state's MPLS neither feasible nor cost effective.

- The State's MPLS network is private, meaning that users on the network can only talk to each other. During a transition period, some healthcare providers would be "cut off" from others. Undertaking a migration will require careful planning and analysis, and is simply too far to go for the Pilot program.
- Commonwealth's MPLS solution's phased (and regional) roll-out schedule is still on-going. Currently there are no healthcare providers using that network
- Many of the healthcare sites are engaged in contractual relationships with other providers and would have to bear additional costs to participate in the state's MPLS solution.
- Limited duration of the pilot

Having considered numerous options, the technical team decided to develop a very flexible interim “hybrid” network focused on the goal of maximizing inclusion (number of sites connected) and achieving the highest quality of service. The flexible design also includes a limited number of connections to both the NetworkVirginia and the NG/Commonwealth of Virginia MPLS networks, which will allow for benchmarking and analysis of network and service delivery approaches. While migrating healthcare providers to an MPLS network remains the long-term vision (pending successful pilot outcome), it was simply too far to go and too disruptive to the healthcare providers to undertake as the first step in deploying the network in support of VAST.

The Solution

As previously noted, the long-term plan is to migrate all² VAST participants to a broadband MPLS network. MPLS fuses the intelligence of routing with the performance of switching and provides significant benefits to networks with a pure IP architecture, as well as, those with IP and ATM or a mix of other Layer 2 technologies. MPLS technology is key to scalable virtual private networks (VPNs) and end-to-end quality of service (QoS), enabling efficient utilization of existing networks to meet future growth and rapid fault correction of link and node failure. The technology also helps deliver highly scalable, differentiated end-to-end IP services with simpler configuration, management, and provisioning for both Internet providers and subscribers. The key points for the network implementation are **Quality of Service** and **security**, both of which will be essential to the VAST applications and necessary to meet current HIPAA requirements. The technical benefit to VAST is the ability to increase the bandwidth at the remote sites for High Definition Videoconferencing and rapid transmission of CT images to the primary stroke center. MPLS will enable us to go from just over 1.5Mbps to 6Mbps without greatly increasing the monthly recurring costs. As the Commonwealth of Virginia/NG builds out its fiber network and the clinical need dictates evolution to greater bandwidths will occur.

As an initial step for the pilot, the UVA Office of Telemedicine will transform their existing telehealth network (including client connections) from a strictly ATM based network to an MPLS environment. Transformation will occur in three (simultaneous) stages:

- **Stage 1** - Working with partners at both Northrop Grumman and NetworkVirginia, (see “NOTE” below) a total of nine (9) sites will be migrated to MPLS
- **Stage 2** - Other sites will have connections upgraded to a higher bandwidth capacity.

² Including sites currently deployed on Network Virginia, participating in the UVA Telemedicine Network, or part of the design completed by the VTN-IWG.

- **Stage 3** - The remaining sites (primarily community health centers) of the UVA telemedicine network will continue to be served by their existing DS1 service (See Figure 19).

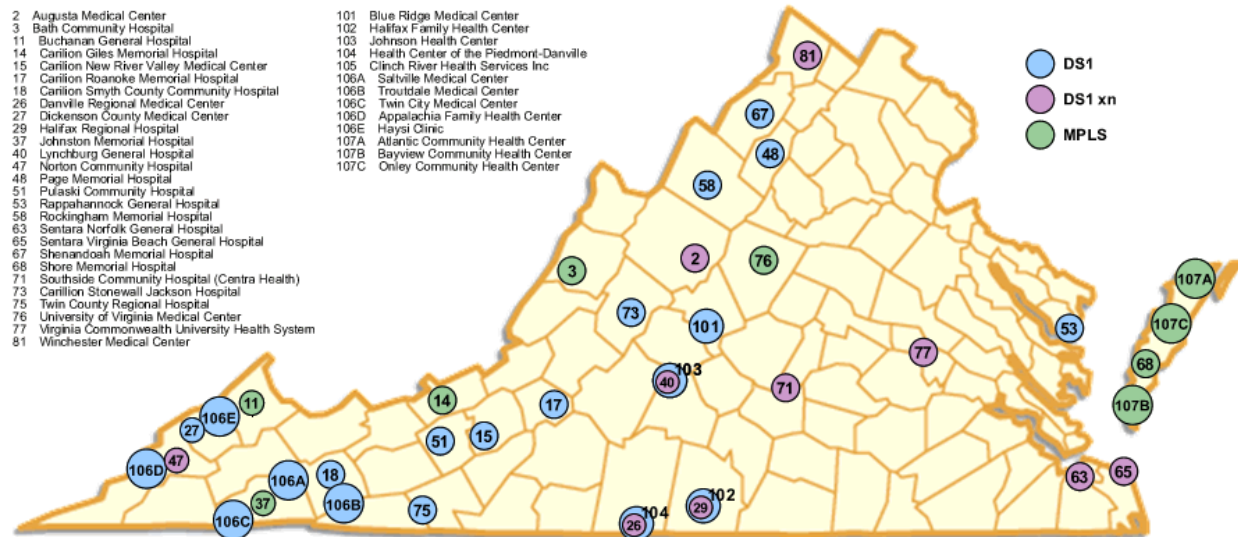


Figure 19 - Proposed VAST Network Deployment

The purpose of using two different entities for deploying MPLS (NetworkVirginia/Verizon and Northrop Grumman) is to use this pilot to evaluate two different network management theories as follows:

- A. **Non-dedicated Technical Resource for Telehealth**-The Northrop Grumman deployed MPLS will have the routers and the network monitored and maintained by Northrop Grumman at their NOC. The Northrop Grumman NOC will serve these sites along with their other non-healthcare users. Northrop Grumman will provide limited access to UVA Telemedicine to a switch at each remote site so that UVA can monitor the end-user telemedicine devices.
- B. **Dedicated Resource for Telehealth**-Under the Network Virginia/Verizon installation, the University of Virginia Telemedicine Network Operations Center (NOC) will continue to maintain and monitor the routers, switches, firewalls and end-user telemedicine devices at the remote sites. The UVA NOC is dedicated to healthcare users, has direct communications and relationships with providers, and understands telehealth applications and the unique healthcare environments in which they operate.

An evaluation will be conducted over the term of the pilot project to ascertain which approach is the most cost effective, efficient and appropriate for the clinical needs of the network.

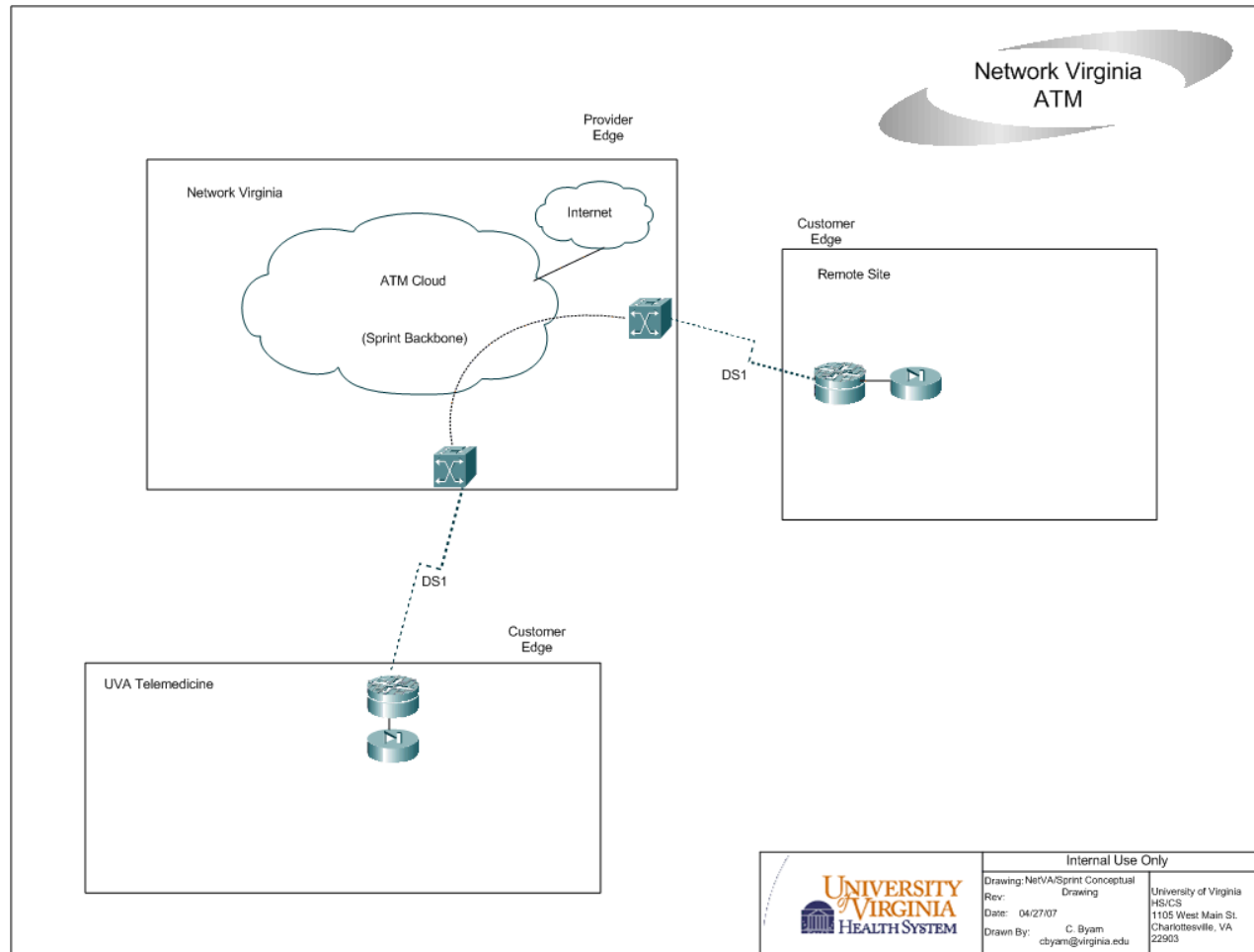


Figure 20 - Current NetworkVirginia ATM Configuration

A complete discussion of each “step” in the network deployment follows below:

Stage 1, Part A

MPLS Migration using Northrop Grumman/Commonwealth Infrastructure; Northrop Grumman provides support and maintenance. Northrop Grumman will provide a Managed Router service utilizing a Multi-Protocol Label Switching (MPLS) network to five (5) telehealth sites (Shore Memorial, 3 Community Health Center sites on the Eastern Shore and Johnston Memorial Hospital).

This will be the start of the Northrop Grumman MPLS telehealth network that is being deployed by the Commonwealth. This MPLS service is called Private Internet Protocol (PIP) service and is a network based Virtual Private network (VPN) service enabling any to any communications over a secure network. The Managed Ethernet Port services starts at the backplane of the customer edge router and provides the local area network all the way to the Telemedicine appliances (See Figure 20). The PIP core network

utilizes service provider routers from leading MPLS router manufacturers. These PE (Provider Edge) routers enable the network to provide low levels of latency for a QOS (Quality of Service) enabled services. The PE routers are designed and configured to provide a robust of availability as required for services such as rural healthcare. The core network consists of OC48 backbone connections between Richmond and Relay MD POP locations with all the other edge nodes utilizing dual OC12 backbone connections. In support of a rural healthcare network, dedicated access circuits from the customer premise will be terminated to the PIP's PE routers to connect to the MPLS network. As a managed network, the circuits are supplied as part of the total network environment and will terminate the dedicated access circuits to its PE routers. The PIP network supports a range of port speeds from DS0 to OCn speeds.

Management and awareness of the environment is provided through the Centralized Management Operations Center (CMOC) which improves collaboration and leverages synergies among platforms. The CMOC also includes the NOC that monitors the health of the network. All network devices are managed for operational effectiveness and operational status. The network management goes beyond elementary root-cause analysis to determine the problem state and then link it into the diagnostic process. Both the operational state of the network and virtual services surviving a failure are key factors to prioritize and aid in the timely resolution of complex problems.

The MPLS managed network includes an internet secure gateway (ISG) design that provides a consolidated, security-focused Internet presence. The purpose of the ISG is to ensure a secure environment for supporting healthcare programs and applications, by providing a multi-layer defense-in-depth security posture by providing virtualized firewalls, intrusion prevention, gateway antivirus, content filtering, and content caching for network constituents.

First and foremost, the ISG provides firewall protection for the healthcare network, permitting traffic that specifically conforms to state information security policy. Techniques implemented at this layer include stateful-inspection firewalling, packet filtering and access control lists. The purpose of this system is to detect and prevent inappropriate material or material that otherwise violates network usage policies. Preventing viruses, spyware and malware at the gateway is an integral part of any enterprise security solution. As part of the MPLS managed network, the ISG solution includes a hardware accelerated anti-virus solution that is capable of scanning thousands of packets per second to determine which of those messages or packets contains or contributes to an active virus, spyware or malware. Lastly, the ISG

solution provides robust intrusion prevention services to the network, providing a proactive means to thwart and report intrusion attempts.

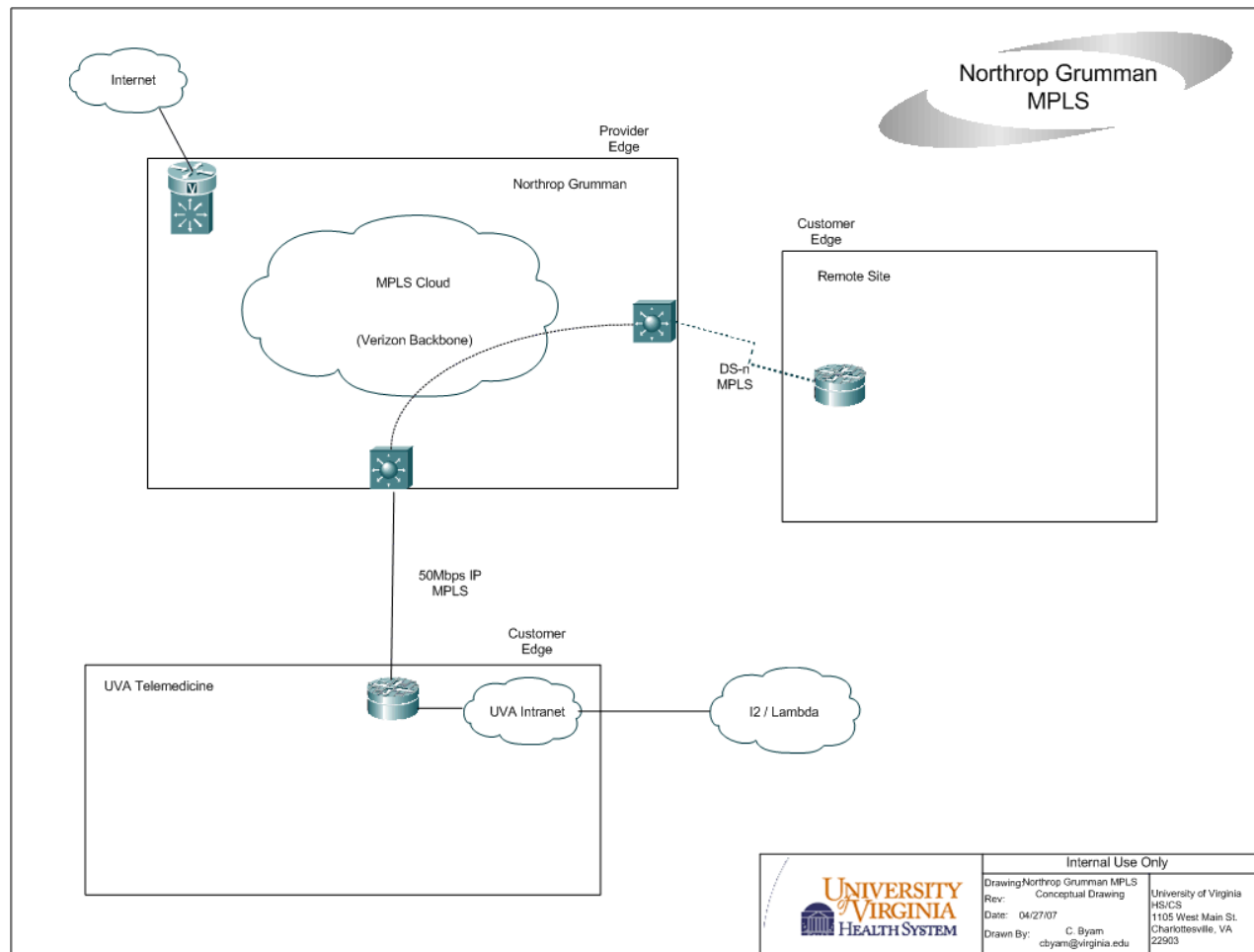


Figure 21 - Proposed Northrop Grumman MPLS Configuration

Stage 1, Part B

MPLS Migration using NetworkVirginia Infrastructure; UVA Office of Telemedicine provides support and maintenance. University of Virginia and NetworkVirginia (Verizon/Virginia Tech) will convert four (4) DS1 ATM sites to MPLS (Bath County, Carilion Giles, Buchanan General, and UVA). Network monitoring and support will remain with UVA. (See Figure 21). Currently UVA works with NetworkVirginia and their telecommunications providers Verizon and Sprint to provide broadband service to our participating sites. The network is managed by Virginia Tech in Blacksburg and the Office of Telemedicine at the University of Virginia monitors the network and maintains the routers, switches and firewalls at the remote rural healthcare sites. The UVA Office of Telemedicine will provide 24/7 network monitoring and support, allowing us to proactively identify, diagnose, and correct any network

problems. This approach will provide a single point of contact for our participating sites and service providers to address issues pertaining to the network.

Stage 2

Upgrade of existing infrastructure to higher bandwidth options. University of Virginia and NetworkVirginia will upgrade four (4) DS1 locations to multiple DS1 circuits for greater throughput. One of the upgraded sites will be the Office of Telemedicine. Using multiple DS1 circuits will allow us to comparatively analyze both network performance and cost effectiveness of our existing infrastructure and the proposed MPLS network solution. As in Stage 1-B, the UVA Office of Telemedicine will continue to provide 24/7 network monitoring and support, allowing for the proactive identification, diagnosis, and correction of any network problems.

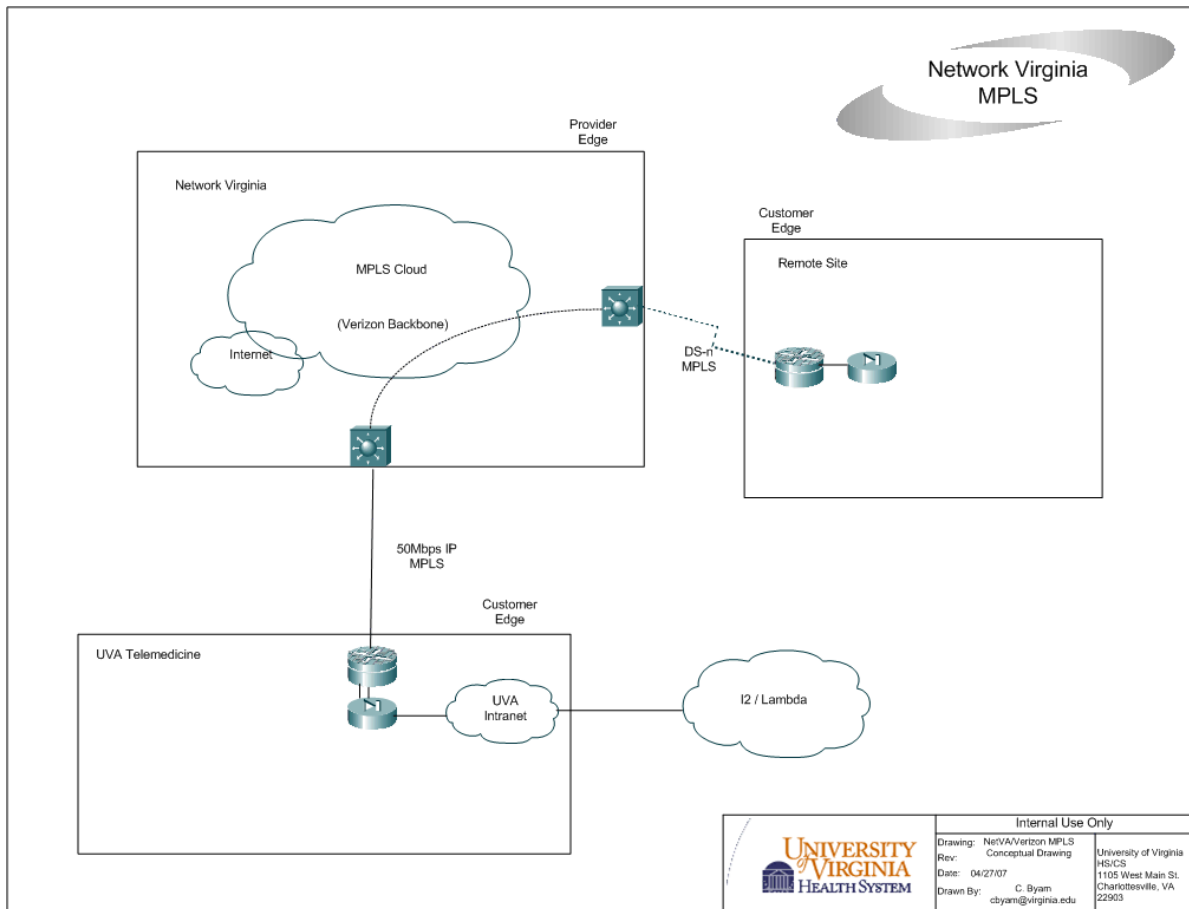


Figure 22 - Proposed UVA/NetworkVirginia MPLS Configuration

During both Stages 1-B, and Stage 2 the UVA Telemedicine NOC will maintain a primary monitoring service for 24/7 monitoring of the network. Should a problem arise, an instantaneous alert will be sent via email and page to designated engineers and managers. The alert will also be audible at the primary server

location. This type of monitoring will provide for a proactive response for any network or telehealth related issues. In addition, the support and engineering teams will schedule and maintain software upgrades to the most current versions. Test drills will be scheduled and performed periodically to ensure compliance and functionality. In the pilot phase, we will be working and monitoring with Northrop Grumman and NetworkVirginia as service providers. Verizon provides the backbone and transport for both providers which will allow for a side by side comparison of QoS and reliability. NG will provide connectivity up to the LAN side of the CPE at the remote site. UVA Office of Telemedicine will work/monitor with NG and the remote site to insure 24/7 availability. UVA will also manage telehealth equipment at the remote sites. Network Virginia will provide connectivity up to the remote site demarc. UVA Office of Telemedicine will manage the CPE and telehealth equipment at the remote sites.

Stage 3 – Status Quo

Those sites falling into Stage 3 will continue to be served by their existing DS1 service. These sites, deemed critical to the clinical care process of stroke, will be integrated into the VAST network but will not receive additional broadband capacity during the pilot.

Additional Activities

In addition to the MPLS migration, we propose an implementation to eight (8) Emergency Medical Service (EMS) providers throughout Virginia (See Section 5). Each provider will have DS1 service installed along with the necessary network equipment (router, switch, and firewall). The connections will be used to offer educational programs to the EMS providers, primarily through the use of two-way, interactive videoconferencing. As the technology matures, participating EMS providers could potentially serve as a point of presence to the larger community, thereby expanding and supporting the VAST network and improving the delivery of care to rural areas of Virginia.

Partnerships

The VAST partnership and associated network infrastructure plan is a testament to the unwavering spirit of cooperation and coordination between organizations across the Commonwealth. The planning, design, and deployment of the proposed advanced telehealth network is (and will continue to be) the product of partnerships that transcend industry, geographic, and technological boundaries. Driven by a common desire to provide quality health care and health education to those Virginians who live in underserved areas, providers and organizations have volunteered countless resources to bring an advanced, yet inclusive, network architecture into being. This same dedicated team will continue to work hand-in-glove

with local telehealth sites to insure that they have the skills and equipment necessary to maximize usage and sustainability

Current project partners that have committed to long-term support of the network include:

- Virginia Polytechnic Institute and State University (Virginia Tech)
- Verizon, Mid-Atlantic Broadband
- Bristol Virginia Utilities
- Sprint
- Ntelos
- Northrop Grumman
- Virginia Department of Health
- Virginia Department of Housing and Community Development
- Virginia Telehealth Network
- Virginia Tobacco and Community Revitalization Commission
- University of Virginia Health System
- Center for Innovative Technology
- Secretaries of Technology and Health and Human Resources

Conclusion

The Commonwealth has a long and rich history of creativity and leadership. By adopting a forward-thinking design for the VAST network, defining high quality health related services to traverse the network, and assembling a cross-functional team to operate and manage the network long-term; the Commonwealth is not only deploying an advanced telehealth network, but also developing a unique “best practices” model with demonstrable and quantifiable results that can be replicated by other states.

Key to the short and long term success of this overall business model is the plans by which UVA and its partners intend to drive network utilization. Simply connecting healthcare provider sites in hopes the network will one day be utilized and grow, is not a viable approach to developing a sustainable statewide telehealth network, and ensuring that FCC investments are well spent. Therefore, we have made a significant effort to focus on utilization and sustainment strategies that will be implemented and tested, as part of this pilot.

5.0 UTILIZATION STRATEGY

Virginia will lay the foundation for future rulemaking by testing innovative business strategies for managing network services and driving network utilization to enhance access to advanced services for public and non-profit health care providers.

After years of experience operating and managing a large regional telehealth network, the Office of Telemedicine understands the issues and challenges surrounding healthcare provider adoption, utilization and sustainment of telehealth/telemedicine networks. In this section, we discuss our approach for aggregating and driving utilization of the VAST network, and offer the FCC options for testing new business strategies as part of the Rural Health Care Pilot Program.

Specifically, we will propose to study different approaches to telehealth network management, and present three use cases-- for FCC consideration—that would further aggregate healthcare provider needs for the VAST network.

Dedicated Telehealth Network Operations Center –vs- Outsourced Managed Service

Positive user experience is critical to maintaining and growing the utilization rate of telehealth services. Accessing and using telecommunications networks and information technologies is a significant part of that experience. As a result, while technology is perhaps the greatest enabler of telehealth services, if it is not being utilized correctly or it's not working properly, it can also be the biggest reason behind declining utilization – or even discontinuance of telehealth services altogether.

Many healthcare sites are at risk for the technology being a source of a negative user experience. Some rural sites do not have the resources to staff technical support positions or have the ability to provide the appropriate on-going equipment training for clinical staff. Under these conditions, it becomes inevitable that at some point problems arise, which in turn raises doubts in the minds of health care providers, who by their very nature, are leery of using tools that they perceive to be unreliable. Rather than users becoming more and more competent – over time – utilization may decline, because staff are unwilling to make attempts to re-familiarize themselves with the technology after problems arise, leading to more problems and errors when and if they attempt to use it again.

In Virginia, the void in technical support is currently being filled by the Commonwealth's telehealth service providers. Each is individually attempting to shoulder the burden and bear the costs of providing rural sites with training, technical support and related services. Often the ongoing level of support needed

by remote sites exceeds the capacity of a service provider's limited resources. Moreover, working independently, the over-taxed providers are each having to invest time and money to individually learn the same lessons on supporting telehealth sites. They are not able to benefit from each other's "lessons learned" or leverage a common system of "best practices."

Not only does this constraint affect rural telehealth sites, but may limit existing telehealth service providers from investing resources towards reaching more underserved communities or providing more telehealth services. Additionally, it represents a major barrier for new telehealth service providers to enter the market, as they perceive the level of effort to support these sites as being too great.

Without a better solution for technical support and related training, Virginia's utilization of telecommunications in supporting rural healthcare will stagnate and ultimately decline, leaving underserved communities with poor access to adequate health care. This deficiency in technical support is being addressed in a number of different ways throughout the country. In some cases, states have set-up dedicated stand alone organizations for the sole purpose of building, operating and managing dedicated telehealth networks. Within these statewide organizations there are offices which have the sole responsibility of managing and providing for the technical and related administrative support needs of all telehealth sites throughout the state. Having a dedicated technical resource that understands and supports its health care users appears to have achieved certain levels of success. Virginia wants to further investigate what has already been implemented elsewhere and test other alternative management solutions as part of its business strategy for the FCC Rural Health Care Pilot.

Virginia knows that to properly advance the utilization of telehealth statewide, "business as usual" relative to how its technical support is organized and managed today, cannot be sustained. The Rural Health Care Pilot Program will test potentially better and more cost effective solutions for providing technical and related administrative support.

As described in Section 4, Virginia will use two different entities for deploying MPLS (NetworkVirginia/Verizon and Northrop Grumman) in order to explore two different centralized technical support models as part of the FCC Rural Health Care Pilot Program. Under the Network Virginia/Verizon installation, the University of Virginia Telemedicine Network Operations Center (NOC) will continue to maintain and monitor the routers, switches, firewalls and end-user telemedicine devices at the remote sites. The Northrop Grumman deployed MPLS will have the routers and the network monitored and maintained by Northrop Grumman at their NOC. Northrop Grumman will provide limited access to UVA Telemedicine

to a switch at each remote site so that UVA can monitor the end-user telemedicine devices. The University of Virginia's Telehealth NOC will be tested against the Northrop Grumman NG NOC for level of responsiveness, ability to resolve issues and most important, levels of customer satisfaction. The processes, procedures, time and cost associated with implementing both models will be documented so that if one should prove to be more effective, it can not only be implemented by telehealth sites throughout Virginia, but shared as a successful model with other telehealth programs across the country.

The network managed service model deployed by Northrop Grumman has proven effective in the support of small state agencies that do not have the traditional capacity or funding to effectively support 24/7 operations. By leveraging support across large and small agencies, identical technical environments and operations support is available and economical regardless of agency size. Several of the smallest Virginia agencies, including the State Board of Elections and the Virginia Museum of Fine Arts are benefiting from new technologies and a low cost solution for complete network and technology management.

Virginia believes its long-term success is directly tied to its overall business management approach which includes technical support, education and training, and strategies, to drive utilization.

Utilization Strategies

While acute stroke is the starting point for the design and implementation of Virginia's statewide telehealth network, as mentioned in Section 3, the entire stroke continuum of care will be used as the framework for designing a wide variety of telehealth applications and driving utilization over time.

In efforts to learn more about creative ways to further aggregate needs and drive utilization, UVA requests the opportunity to take on three specific sub-studies as part of the overall pilot effort. Use Case #1 will demonstrate how expansion of FCC "eligible" providers/sites might help support cohesive and integrated systems of healthcare. Under current FCC rules, this part of the stroke care continuum is not supported. The inability to connect this user group to the network represents a gap in stroke education and prevention and critical healthcare communications. In Use Case #2, we hope to demonstrate the value of connecting rural hospitals to their community-based physician practices in support of data sharing. And, in Use Case 3, we consider the missions of regional health information organizations (RHIOs), in this case, CARESPARK, and the importance of studying how the state-wide telehealth network might support their needs.

Use Case # 1: Emergency Medical Services (EMS) Provider Training

EMS is a critical component of the stroke care continuum (see Figure 6 in section 2). This includes the training of EMS providers on recognizing the signs and symptoms (detection) of stroke. With broadband access that is robust, we can provide this training on a continuing basis to providers in rural areas. One of the great disparities between rural and urban EMS care is the time it takes to access definitive care at the receiving hospital. Reducing the time from 911 activation, to arrival at an appropriate healthcare facility can reduce morbidity and mortality for stroke patients. It is a given that total out of hospital times will be longer for rural EMS transports due to their distance from hospitals. However, one variable that contributes to out of hospital time is time spent on the scene by the EMS crew. Some factors that contribute to prolonged scene times are training and competence. Previous studies have shown differences between rural and urban EMS systems in areas of advanced versus basic life support levels of care, as well as provision of advanced life support procedures. Because of the infrequency of providing advanced life support procedures in rural EMS, there is the potential for lack of familiarity with equipment and skill erosion if training is not provided on an ongoing and regular basis.

There are over 800 EMS facilities in Virginia if all fire stations and rescue squads are included. All EMS providers are required to take courses for certification and continuing education (CE) courses for recertification. The required CE courses are currently offered by the Virginia Department of Health (VDH) Office of Emergency Medical Services (OEMS) in four ways:

- Satellite - Emergency Medical Services Satellite Training (EMSAT) is a monthly, one-hour interactive training and information program for Virginia EMS and Fire personnel. Certified Virginia EMS providers may receive category I CE credit by viewing an EMSAT broadcast at one of the approximately 60 designated state sites.
- On-site – OEMS approves classes that are taught by approved instructors at various site locations around the state and will occasionally offer a course at a VDH site location.
- Internet - with the proper equipment, viewers at designated EMSAT sites in Virginia are able to receive Category 1 and 2 CE credits via the internet while at an OEMS Designated EMSAT Site. This is done through web streaming of live EMSAT programs during the same time as the regular C-band satellite broadcasts
- DVDs – these are provided at cost and mailed to providers along with the quiz/exam

Approximately 6,000 individuals take part in CE credits each year out of the 35,000 person workforce. VDH OEMS presently pays a satellite uplink fee of \$2,400 per month to provide the EMSAT capability. This year, VDH OEMS started videostreaming their satellite course at their EMSAT facilities as an interim step toward on-demand web-based continuing education. However, they have discovered that receiving videostreamed broadcasts requires a considerable amount of bandwidth, and facilities who have broadband sometimes still have difficulty. VDH OEMS is planning on doing away with DVDs and satellite at some point in the near future, with plans to go to all online videostreaming, making it available 24/7. VDH OEMS is presently building a learning management system infrastructure which should be fully implemented in the next several months. VDH OEMS feels that if all facilities had robust broadband access, it would triple the amount of people receiving CE credits each year. This would significantly enhance the EMS infrastructure, particularly in rural areas.

Given that some of the sites and health care provider types described on the stroke care continuum are currently ineligible under the FCC rules for the Rural Healthcare Program and Pilot, Virginia proposes to demonstrate to the FCC, the value of these participants in driving network utilization, and most importantly, ensuring comprehensive systems of health care. Ideally, although not considered an eligible healthcare provider under section 254 (25) B of the Act, we believe the Commission has the authority to include Emergency Medical Services Providers under section 254 (7) c 1 A of the Act. These sections address principles appropriate for the protection of the public interest and are essential to education, public health and public safety.

(7) ADDITIONAL PRINCIPLES- Such other principles as the Joint Board and the Commission determine are necessary and appropriate for the protection of the public interest, convenience, and necessity and are consistent with this Act.

“(c) DEFINITION-

(1) IN GENERAL- Universal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services. The Joint Board in recommending, and the Commission in establishing, the definition of the services that are supported by Federal universal service support mechanisms shall consider the extent to which such telecommunications services--

(A) are essential to education, public health, or public safety;

We request consideration of the inclusion of 8 EMS facility sites within this acute stroke intervention network as these providers are a critical first access point into the rural health care system. Alternatively, should the Commission deny this request we seek funding for all other elements of the proposal.

Use Case #2: Connectivity Between Hospitals and Physician's Offices

Johnston Memorial Hospital (JMH) located in Abingdon, Virginia is a modern medical center equipped with state-of-the-art technology and more than 700 employees and 120 medical staff members. Non-invasive cardiology services, an emergency room expansion, an open MRI, and a central energy plant are just a few of the hospital's most recent additions. The facilities have expanded, equipment has been added, and technology has been upgraded, but the tradition of caring has always been present. It is the continued commitment of the employees, medical staff, and volunteers to providing high quality, compassionate care that has sustained JMH throughout the last century and will lead JMH into the future.

The commitment to quality care in a rural setting is challenging, even for a facility such as JMH. Attracting and retaining specialty care physicians is difficult and costly – often prohibitively so. Therefore, it is imperative that JMH seek out creative opportunities to maximize the availability of specialty care and leverage scarce capital resources. The application being presented to the FCC by the Commonwealth of Virginia through the University of Virginia is exactly the type of partnership opportunity JMH needs to expand and enhance the level of stroke care available in Southwest Virginia. Absent of timely “physical” access to primary stroke care centers located in central and eastern Virginia (more than three hours away), the proposed Commonwealth “stroke” network offers new and unparalleled intervention and treatment opportunities.

Recognizing that a single condition is not going to present itself often enough to sustain the high-level of telecommunication capabilities needed to support the stroke network and its associated diagnostic equipment, JMH has partnered with Bristol Virginia Utilities to investigate and experiment with layering additional data intensive applications onto the network to augment the usage of the enhanced telecommunications capabilities and subsequently sustain the system long term.

As previously mentioned, medical diagnostic equipment has consistently become more sophisticated and more digitally oriented. The medical images and results (files) from the equipment continue to grow in size. Increasingly, JMH depends on these files to provide the basis for a high quality of care to the patients of Southwest Virginia. In order for a high quality level to be maintained, not only do patients need access to the diagnostic equipment, physicians must also have 24/7 access to test results in order to

provide timely diagnosis and treatment. Physicians using the JMH facility must be able to access the results of these tests if there is ever going to be quality parity between rural and urban healthcare markets. Currently, many of the physicians and clinics do not have the bandwidth necessary to view the results and images and consequently cannot offer the desired level of care.

While the clinical benefits of a high capacity data network are undeniable, it is imperative that JMH (and other partner providers) be able to support and sustain the network long-term. While a majority of the UVA proposal will concentrate on the deployment of the stroke network, JMH will be working with Bristol Virginia Utilities to design and evaluate “sustainability” models, including the ability to aggregate bandwidth and share it in accordance with USAC/FCC guidelines across clinics and doctors’ offices who are currently “under”/”un”-connected.

The sustainability model to be tested is to develop an aggregation model for the deployment of a local high-speed data network that will not only “hook” into the UVA pilot network but also allow the JMH medical community (39 independent care providers) to be connected to the network to view diagnostic test results and electronic medical records. If successful, the result will be a replicable, sustainable business case based network capable of providing physicians with a higher level of communication which will allow for a higher level of care.

To this end, JMH and BVU have developed the concept of a "local medical community broadband network" that we believe can be used as a model to provide RHC-funded local broadband infrastructure connecting RHC-qualified hospitals to the medical community they service. This model attempts to deal with the most significant barrier we see in getting ubiquitous broadband access to a local medical community and that is this: most for-profit healthcare providers (ie. physicians) will not purchase broadband access for anything other than their personal practice use (ie. Internet), and even then it tends to be best-effort asymmetric service that is not conducive to high-bandwidth interactive medical applications such as imaging and video. These applications require symmetric bandwidths much greater than the typical consumer-oriented Internet service. Aside from future legislative or regulatory changes, there does not appear to be any other catalyst to remove this barrier. This model is generic, but uses JMH as the specific case for the grant. Essentially, JMH would act as a "broadband aggregator" for their local medical community as follows:

JMH would connect to the VAST network via a high speed broadband connection constructed by the RHC grant. JMH, again, with RHC funding, would construct broadband connections to members of their

medical community to provide ubiquitous broadband access for caregivers to clinical and diagnostic data including that required for stroke management. JMH, in cooperation with BVU, would serve as a "local medical network hub", providing gateway access for the medical community to the regional (ie. CareSpark), state (ie. VAST), and national healthcare networks that develop over time. (See Appendix G for BVU Network Diagrams).

Network sustainability would be realized through the purchase of network services by the local health care providers. All health care providers could purchase private services (ie. Internet, phone, etc.) if desired directly from BVU, and local clinical applications could be turned up by JMH as required. BVU would provide maintenance of the network as part of their normal operations. JMH would use e-health monies from the USAC RHCP to help pay for the recurring cost of the state network connection. For-profit providers would be responsible for full payment of their private services.

The local medical community served by JMH in Abingdon VA consists of 63 healthcare providers, of which 48 are serviceable by BVU. Of that 48, 9 are currently connected to the BVU fiber-based broadband network and 39 are not. Based on 2006 FCC broadband data, we estimate roughly 60% of Virginia's businesses utilize broadband services. Based on this pilot site sample, it is clear physician adoption is far below the statewide business average. We estimate it would require \$110,000 to extend the fiber network to these 39 facilities such that broadband medical services can be delivered ubiquitously. We have provided a few relevant points using the RHC pilot program FAQ showing how our "local medical community" broadband network model complies with the program guidelines:

Who is eligible to receive funding under this program?

Public and not-for-profit health care providers are eligible to receive funding.

JMH would be the qualified not-for-profit provider receiving funding to build infrastructure required by them to connect to the state telestroke network and to connect their local medical community as part of the larger regional network.

1. What is the Rural Health Care pilot program?

The pilot program is an enhanced funding initiative intended to help public and non-profit health care providers construct state- and region-wide broadband networks to provide telehealth and telemedicine services throughout the nation.

It usually takes a physician to provide a telehealth/medicine service. We do not believe it is practical or reasonable to expect that physician to always be at the JMH facility to provide the service. Therefore,

JMH would use RHC funds to connect that physician facility through the JMH medical community hub to perform the service. This would make the physician a telecommuting telemedic.

2. *What information must be filed with the FCC to apply for the program?*

Describe how for-profit network participants will pay their fair share of the network costs

For-profit entities would pay 100% of the cost for any services they order that are delivered over the fiber connection (ie. Internet).

3. *Will for-profit health care providers be allowed to connect to the network?*

Yes. Applicants may include for-profit health care providers in their proposals as network participants.

However, for-profit health care providers will be required to pay for their own costs of connecting to the network.

In this case, there are no for-profit providers applying for funding of any type (construction or recurring), and the for-profit providers will be paying their own costs to use the network if/when they require it.

This use case will continue to expand in scope as hospitals, health plans, and the state work to expand the use of administrative and clinical data exchange. In addition to the clinical uses outlined in the JMH example, the Hospital and Health Plan associations in partnership with the state (including Medicaid) are actively pursuing a strategy to dramatically increase the volume of HIPAA standard data that is exchanged.

Currently, transactions that take place online range from 42% to 95% depending on the transaction (Eligibility inquiry, Referral / Authorization, Claims Submission, Claims Status Inquiry, Pay / Remittance) with Virginia's most aggressive adopters. Online transaction rates are significantly lower for providers that are slower to adopt ranging from 5% to 68%. Virginia is pursuing a model of administrative data exchange based on the experience in Massachusetts with the New England Health EDI Network. This network has driven data exchange to nearly 50 million transactions yearly with 100% private market support for the network (no public subsidy). Additionally, as the infrastructure to support data exchange expands as part of this pilot we expect that more and more providers will have the ability to drive transaction volume to the network. A combination of increased penetration rate for HIPAA transactions and an increase in volume will become a major driver of usage for the telehealth network's infrastructure adding to the sustainability of revenue for the network.

Use Case 3: Supporting Regional Health Information Organizations (RHIOs)

CareSpark is a regional health information exchange designed to serve 750,000 patients residing in nine rural and medically-underserved counties of far southwest Virginia, in addition to eight counties in northeast Tennessee. Among the approximately 1,200 physicians in the region, the large majority of specialists and tertiary-care facilities are located in Tennessee, including a center of excellence for stroke at Wellmont Health System's Bristol Regional Medical Center and Colleges of Medicine, Nursing, Pharmacy and Public Health at East Tennessee State University. Exchange of clinical data that includes inpatient, emergency department, ambulatory, laboratory and pharmacy information enables coordination of and improvement of patient care and treatment. Through collaboration with state and local departments of health in both Tennessee and Virginia, CareSpark will also enable the collection and analysis of aggregate data for the purpose of public health monitoring and improvement in order to reduce the region's significant health disparities for cardiovascular disease, hypertension and stroke, diabetes, cancers and chronic pulmonary diseases, whose rates for prevalence and premature mortality are among the worst in the nation.

CareSpark's technical infrastructure will be operational in the summer of 2007, initially authenticating and connecting approximately 250 clinicians affiliated with Holston Medical Group (including offices in Abingdon, Duffield and Weber City Virginia, as well as twelve other facilities in Tennessee), Mountain States Health Alliance (including Smyth County Hospital, Dickenson County Hospital and Norton Community Hospital in Virginia, as well as six other facilities in Tennessee), Wellmont Health System (including Lonesome Pine Hospital in Virginia, as well as six other facilities in Tennessee), and Johnston Memorial Hospital in Abingdon, Virginia. 250 additional physicians will be connected in 2008, including twelve federally-qualified health centers in southwest Virginia and thirteen in Tennessee.

While CareSpark's work over the past four years has resulted in strong regional consensus about the types of data to be shared, the appropriate access and use of this data, and the development of an interoperable technical infrastructure that enables sharing of data across disparate electronic health records systems, many primary care physicians in more remote rural areas (over 40% of the health care providers in the region) are not currently using electronic health records within their organizations. While most (95%) have access to the internet at home or in their offices, an estimated 10-15% do not have access to broadband access (either wired or wireless) because of the mountainous topography and /or distance from existing fiber-optic or other networks. Where that access does exist, rates are up to 200% higher than in more urban areas of the state, due to the cost of delivery and support for internet services in these more rural areas of the state. Until more affordable and accessible broadband services are available to these

rural clinicians, use of health information technology by physicians for coordination of patient care, monitoring of health status, continuing medical education and communication with patients will be hindered, resulting in even greater disparities for cost, health outcomes and adoption of clinical best practices. The Virginia Acute Stroke Telehealth (VAST) Network and the CareSpark network share a number of rural hospital sites in common. The implementation of the VAST Network would expedite the implementation of the CareSpark RHIO, bringing greater bandwidth and a more robust technical infrastructure to multiple sites.

Sustainability

The University of Virginia has had an active Telemedicine program for eleven years. The Office and a number of remote sites are funded by the UVA Health System. Many of the initial efforts to establish rural healthcare Telemedicine sites were funded with grants from both the federal government and the Commonwealth. All of the grants have expired and the program keeps expanding. The rural healthcare providers have seen the benefit of broadband communications not only for Telemedicine and Teleradiology purposes but also for transmitting patient records and billing and registration purposes. There are a number of sites within the existing and proposed network that are self funded. Those sites that are eligible make full use of the USAC RHCP funds which greatly helps them with support for their communications costs. We envision that increasing the bandwidth to a number of these remote sites will enable them to better utilize the network for a minimal increase in expense.

The University of Virginia will continue to seek out other sources of funding such as through the United States Department of Agriculture, Rural Utilities Service and the Department of Health and Human Services Office for the Advancement of Telehealth to enhance service delivery to the citizens of Virginia. We will also continue to seek ways to enhance reimbursement for telehealth services. We work closely with the Virginia Department of Medical Assistance Services (DMAS). DMAS has supported reimbursement of telehealth facilitated services since 1995 and is committed to exploring opportunities for changes to Medicaid telehealth reimbursement that could lead to better health outcomes for Virginia's Medicaid recipients while enhancing the sustainability of telehealth service providers.

Finally, the lessons learned about the most effective way to manage services and the lessons learned through the proposed "use cases" from this Pilot will inform us and the FCC of drivers of utilization beyond that which we know already works. We have already demonstrated over time that telehealth is a sustainable venture in rural Virginia. We foresee this Pilot as being a catalyst for exponential growth of telehealth in the Commonwealth.

6.0 MANAGEMENT PLAN

The University of Virginia Office of Telemedicine, along with its chosen partners, is dedicated to the successful deployment of broadband infrastructure and the development of a statewide telehealth network. A qualified Management Team has been chosen and a management plan and quality controls are already in place.

The Office of Telemedicine at the University of Virginia (UVA) Health System is proud to serve as the Applicant for Virginia's FCC Rural Healthcare Pilot Program. As the lead agent for the Commonwealth, fiscal and legal executor of the Pilot Program, and operator of the proposed UVA Telehealth Network Operations Center for VAST, we have significant responsibilities for administrative, programmatic and network oversight. Given the scale and scope of this effort, we have taken great care to develop the appropriate management plan and governance process for the pilot program.

This section lays out our objectives and philosophies for managing the Rural Health Care Pilot Program, identifies all those that support our approach, introduces key personnel and sets our initial project plan and schedule.

Objectives

The following describes how the program will be managed to achieve the following objectives.

Central Program Objectives:

- Deploy a broadband network infrastructure to eligible healthcare providers that adheres to cost, schedule and performance
- Monitor and evaluate the network strategy and approach
- Report findings to the FCC

Related Objectives:

- Develop a Tele-stroke Network and other related applications to drive network utilization
- Pilot new strategies for network utilization and sustainment
- Develop an evaluative framework for measuring qualitative and quantitative impacts of telehealth interventions.

Management Overview

Our Key Principles

As the Applicant and leader of the program, the UVA Telemedicine Office will use the following key business management principles to guide the effort.

- Coordinate efforts
- Create needs-based solutions
- Build flexible and scalable solutions
- Build on existing capabilities
- Leverage existing network infrastructure
- Exploit leading edge technologies
- Evaluate our solutions

The Telemedicine Office has already begun to apply these principles as part of its management approach to developing this proposal.

Coordinated Management Approach

UVA strongly endorses the development of a statewide telehealth network as envisioned by the Virginia Telehealth Network (VTN). UVA intends to leverage the partnerships with healthcare organizations and government leaders developed by the VTN, to facilitate joint decision-making and enable thoughtful coordination of the activities associated with the Rural Healthcare Pilot Program on an ongoing basis.

Key state officials and health care providers have been briefed on the proposal and management plan. They are in full support of the approach, and are looking forward to our successes. The Telemedicine Office is proud to list all those that support our efforts, and their letters of support for your review (see Appendix C).

Federal Legislators

- Senator John Warner
- Representative Jo Ann Davis
- Representative Thelma Drake
- Representative Robert Scott
- Representative Virgil Goode

- Representative Bob Goodlatte
- Representative Eric Cantor
- Representative Rick Boucher

Virginia Legislators

- Senator Phillip Puckett
- Senator Charles Hawkins
- Delegate Harvey Morgan
- Delegate Lynwood Lewis
- Delegate Robert J. Wittman
- Delegate R. Edward Houck

State Government

- Marilyn Tavenner, Secretary of Health and Human Resources
- Aneesh Chopra, Secretary of Technology
- Kathy Wibberly, Virginia Department of Health Office of Health Policy and Planning
- Karen Jackson, Director of the Commonwealth's Office of Telework Promotion and Broadband Assistance
- Patrick W. Finnerty, Director, Department of Medical Assistance Services
- Bill Shelton, Virginia Department of Housing and Community Development

Healthcare Providers

- University of Virginia Health System
- Virginia Commonwealth University
- Danville Regional Medical Center
- Johnston Memorial Hospital
- Eastern Shore Rural Health System
- Centra Health
- Clinch River Health Services

Regional Health Information Organizations

- CareSpark

Organizations

- Center for Rural Virginia
- Medical Society of Virginia
- Virginia Tobacco Commission
- Virginia Hospital and Healthcare Association
- Virginia Primary Care Association
- Virginia Rural Health Association
- Virginia Stroke Systems Task Force

Leadership Roles and Responsibilities

The UVA Telemedicine Office will assign a Rural Health Care Pilot Program Director who will be responsible for the fiscal oversight and management of the pilot. Under the Director, will be a Program Manager responsible for overseeing the deployment and evaluation of the VAST network to 48 sites, and supervising senior network engineer (and other support personnel), in the 24 x 7 operations of the UVA telehealth NOC.

Management Activities will include:

- Government Coordination- All activities associated with FCC coordination and correspondence
- Contracts Administration- All activities related to fiscal management
- Reports- all activities associated with preparation, data collection, development, and distribution of reports and presentations.
- Support- All activities relating to staff support, legal, human resources and administrative support, as needed for the efficient conduct of business.

Financial Tracking and Reporting

The UVA Telemedicine Office will utilize UVA Health Systems institutional financial accounting system to track contract expenditures.

Plans for Monitoring and Evaluation

UVA as developed a plan of approach for monitoring and evaluation to ensure the FCC Pilot produces information that will be helpful to the FCC for future rule-making, and help guide the state in designing the overall statewide telehealth network of the future.

Our evaluation plan will have four primary goals:

1. to assess whether FCC Pilot objectives have been met and evaluate any barriers that were identified in the process
2. to assess the performance and adequacy of the technical infrastructure developed and implemented during the pilot
3. to begin evaluation planning for the clinical applications that will build on the technical infrastructure implemented in the pilot phase
4. to assess the quality of the network support model used in the pilot

Implementation Evaluation

The goal of this component of the evaluation is to continuously monitor and evaluate the extent to which the specific objectives and milestones detailed in the FCC Pilot Project Plan were achieved. In addition, this assessment will enable us to rapidly identify problems that may emerge so that solutions can be developed. The details outlined in this proposal will be used to develop specific evaluation questions, and the evaluation team, independent of technical staff or implementation personnel, will solely determine the answers to these questions. Sample evaluation questions might include:

- Were all sites properly connected/linked together as planned? If not, why not?
- What barriers were identified that delayed or prohibited sites from joining the network?

Assessment of Technical Infrastructure

During the initial year of our project, we will establish the necessary technical infrastructure for establishing connectivity between healthcare provider locations. Another important element of our evaluation will assess the performance of this infrastructure and its ability to meet important requirements for telehealth applications. Evaluation questions for this section might include:

- What was the data transfer speed of transmitting particular types of information, including high resolution CT scans?
- How frequent and severe were any network outages that occurred?
- Was network security sufficient for transmitting confidential patient data?

- What were the type / cost of resources needed by provider sites for connecting to the network?
- Were there any unanticipated consequences?

Assessment of Technical Support Model

Our evaluation will also address the suitability of a Managed Services Provider (MSP) approach for providing technical network support. We will assess the level of responsiveness provided by this model, ability to resolve issues and overall customer satisfaction. We will identify strengths and weaknesses of the MSP approach and work with the planning team to allow comparison of this model with alternatives, including the telehealth NOC.

- What kinds of support were needed by provider institutions?
- What was the mean time to resolution for various types of technical difficulties?
- What was the level of customer satisfaction with the technical support?
- What kinds of technical difficulties were handled well by the MSP? Poorly?

Evaluation Planning

The final part of our evaluation will lay the groundwork for the important next steps in our statewide initiative, development of the telehealth stroke model of care. This next phase will require a comprehensive evaluation that assesses satisfaction with the program from the perspective of multiple stakeholders as well as clinically-oriented process and outcome measures. Our goals for this year will include identifying important measures to assess in subsequent evaluations, and development and testing of pilot instruments for data collection. Measures will be determined on the basis of a literature review and stakeholder interviews. Sample questions might include:

- What measures are important to include from the standpoint of rural clinicians? What about those at larger institutions that are providing the consultative telehealth services? What about the patient perspective?
- What measures have been assessed in other large telemedicine initiatives?
- What instruments are available that have been developed, used, and/or validated for assessing these measures?

Management Team

Introduction the Applicant – The Office of Telemedicine, UVA Health System

The Office of Telemedicine at the University of Virginia Health System was established in 1995 to provide remote consultative and distance learning opportunities for patients and health professionals in the Commonwealth and beyond. The telemedicine program at the University was initially developed without external grant funding but rather, as an investment to facilitate achievement of our clinical, educational, research and public service missions. To date we have supported more than 9700 clinical encounters in more than 30 subspecialties of healthcare and tens of thousands of teleradiology services along with thousands of hours of broadcast education. Our network of more than 60 sites includes rural and urban community hospitals, critical access hospitals, a Veterans Hospital, rural clinics, federally qualified health centers, schools, prisons and other academic health centers in Virginia. We also support international consults and programming.

Organization

The Office of Telemedicine is staffed by a part-time medical director, a full-time director, three additional full-time technical personnel, an office manager, and a secretary/coordinator who schedules/coordinates all patient consultations. Patient consultations utilize the health professional faculty all of whom are employees of the University of Virginia Health System. All are committed to participation in the telemedicine program. The Vice President for Health Sciences, the Deans of the Schools of Medicine and Nursing, the clinical department chairs and the administration of the Medical Center are all in full support of our telemedicine initiatives.

We are members of the Virginia Telehealth Network, the Center for Telehealth and E-Health Law and the American Telemedicine Association. We have served as a pilot site for the Southern Governor's Association Biopreparedness exercise.

Clinical Services

The Office of Telemedicine has developed protocols to facilitate the efficient coordination, implementation, and evaluation of all consultative activities. We are prepared for the expected increase in activities should funding of this proposed expansion of telehealth in the Commonwealth be successful. We currently facilitate approximately 120 telemedicine related encounters per month separate from but related to our teleradiology program. We have a new home telehealth program. We have arranged for service-specific "clinics" delivered via videoconferencing technologies to gain efficiencies of scale. Services may be accessed on a 24-hour emergency basis and consultations can be scheduled by accessing

the Telemedicine Office via telephone, through the hospital page operator, through the emergency room MEDCOM communications network, or via electronic mail.

Innovative applications of telemedicine based on clinical need and geographic isolation have included the use of the clinical workstations screening for diabetic retinopathy, remote access to clinical trials, collaborative tumor boards, emergency preparedness training, training for continuing health professional education, for resident training, and for student training. We provide clinical care in more than 32 different specialties and subspecialties both in live formats and in store and forward mode.

Education

Patient education programs are designed, organized, advertised, and evaluated by the relevant clinical “Center” based on needs identified by a variety of sources. Endorsed by a Community Coalition for Health in southwest Virginia, the State Department of Health has received a grant to address high prevalence, complications, and mortality rates of patients with diabetes in this region. As part of the diabetes grant, the University of Virginia Diabetes Community Network Center has been selected by the Department of Health to provide outreach educational services to the citizens of southwest Virginia. We have also developed several educational programs addressing issues of behavioral and developmental pediatrics at the request of Project Head Start teachers, administrators, and social workers in southwest Virginia.

Health professional educational programs are designed, organized, advertised, and evaluated by the Office of Continuing Medical Education based on the identified needs of the community health professionals to include locally requested clinical topics, nationally mandated programs as required by JCAHO and OSHA, and we have broadcast the CDC's programs on bioterrorism and chemical warfare. Participation in such educational opportunities are critical for rural Virginia health professionals who effective January 2000 have been required by the State Board of Medicine to participate in 60 hours of continuing medical education for renewal of their medical licenses. In the absence of community based medical education programs, attainment of this volume of continuing education activities is otherwise impossible for health professionals residing in the targeted communities.

Research

We participate in clinical and educational research using advanced technologies, both within the Medical Center and in the School of Nursing NIH funded Rural Health Care Research Center (RHCRC). This Center provides the infrastructure to conduct and disseminate research responsive to the clinical and

information needs of rural populations in the United States. The RHCRC tests innovative clinical and system interventions for the rural health care system and adapts existing interventions for use in rural areas. We are collaborating with the Center to investigate the role of emerging telehealth technologies as a strategy to overcome the scarcity of services and expertise in rural areas.

Public Service

We regularly use our network for public service to include engagement in rural health fairs serving thousands of uninsured Virginians annually, and we staff an ongoing collaboration with “Freedom Calls” so as to connect Virginians deployed with the military to Iraq with their loved ones at home.

USAC Support

We serve all eligible partner sites in our network by applying to USAC on their behalf for discounts through the USAC Rural Health Care Program. We were recently successfully audited by USAC without any deficiencies.

Management Consulting Partner, Telehealth Strategies, LLC

The UVA Telemedicine Office will subcontract with Telehealth Strategies (THS) LLC, a Virginia-based, woman and veteran-owned, small business for program management support, and to manage and coordinate the deployment and implementation of the VAST network. THS is uniquely qualified to manage the FCC Rural Healthcare Pilot Program and distinguishes itself in three ways:

- **Reputation**—THS has been a telehealth pioneer working as a valued partner along side large global health care organizations to research, test, develop and implement telehealth systems aimed at improving access and quality of health services to rural remote and underserved areas around the world.
- **Expertise**— THS has uniquely diverse qualifications and subject matter expertise spanning the business and management, policy, technical and clinical arena. THS experts have over 24 years of combined experience working these core areas to facilitate the implementation of distributed health systems in remote and rural healthcare settings.
- **Past-Performance**— THS has a proven track record of successful contract performance supporting telehealth industry leaders.

UVA and THS will serve as the Core Management Team for the Pilot Program.

THS is presently under contract with the Virginia Department of Health to provide rural and telehealth systems analysis and planning support, and to coordinate the newly incorporated Virginia Telehealth Network (VTN). THS dual roles, will serve as the cornerstone for ensuring the joint alignment of the FCC Rural Healthcare Pilot with the on-going efforts of the VTN. It is the desire of UVA and its partners to be able to leverage the FCC Rural Health Care Pilot as a way to propel the Virginia Telehealth Network (VTN). Should Virginia become the recipient of FCC Rural Healthcare Pilot funds, UVA has already received a letter of support from this Administration for the allocation of State resources to undergird the VTN administrative structure with staffing, marketing and program evaluation support. This, in turn, will directly add value to UVA's implementation of the FCC Rural Healthcare Pilot.

The mission of the VTN is to advance the adoption, implementation and integration of information and telecommunication technologies into mainstream health systems statewide to improve access to quality healthcare for all Virginians. The VTN has identified three priority areas:

Information Collaboration

The VTN will build a body of knowledge that encapsulates "best practices" for operating effective and sustainable telehealth services, as well as "best practices" for designing, operating and sustaining remote telehealth sites. This know-how will be assimilated from successes within Virginia's as well as effective programs from throughout the country and internationally. The information will be disseminated through on-site training, web-based training programs and the VTN website. (www.Ehealthvirginia.org)

In emulating these practices, participating health care providers will increase operational efficiencies, reduce associated cost, and improve customer satisfaction, which collectively will improve access to health care through greater utilization of Virginia's telehealth network.

Development of Standards

To truly provide a positive impact on improving healthcare in underserved communities, remote telehealth sites need to provide their communities with access to many different types of medical expertise. Today, Virginia's telehealth service providers are primarily providing medical expertise to support medical specialty consultation. With standards in place, medical expertise to support other types of services can be established. This enables remote telehealth sites to offer more services without the individual telehealth service providers having to "reinvent the wheel" and support every area of medical expertise needed.

In order to facilitate this, the VTN will work to establish standards in three areas:

- ***Business standards*** to ensure common operating agreements to facilitate the sharing of information and services, and to smooth the reimbursement/payment processes
- ***Operational standards*** that enable health care providers to deliver services to patients using standardized template/clinical formats to ensure quality of service and facilitate the evaluation process
- ***Technical standards*** to ensure seamless hardware and software compatibility and connectivity

With underserved sites providing their patients with access to more health care services and the telehealth service providers able to provide their services to a greater number of rural and remote clinics, the sustainability of both is greatly enhanced and network utilization is substantially increased. The development of standards will also help drive other critical initiatives, including implementation of electronic medical records.

Representation and Facilitation

VTN fairly represents the interests of all health care providers in the Commonwealth as it interfaces with various health agencies, commissions, workgroups, special interests and others constituents within the government. It identifies and monitors key regulatory and policy issues important to the adoption and mainstream integration of telehealth and ensures the work of the VTN and its membership is consistent with priorities established by the Virginia Department of Health and the Commonwealth of Virginia.

In its role, the VTN is able to identify common needs, issues and concerns of telehealth networks, and in partnership with appropriate parties, develop strategies for facilitating collective solutions. These solutions could include, but are not limited to, reimbursement, participant compensation/ payments, state and federal regulations, collective buying and negotiation powers, grant writing and other forms of access to government funded health care initiatives such as the Universal Service Fund etc.

Through information collaboration, establishing standards and being a common voice for representation and facilitation, the VTN is focusing on taking advantage of the opportunities and addressing the challenges that will have the biggest impact on increasing both the reach of telehealth services available to underserved rural communities in Virginia. By strengthening health care systems as well as the very

services they are providing and consuming, network utilization will grow and participation in the FCC's Universal Services Fund will significantly increase.

The Office of Telemedicine and THS, in coordination with VTN, have proudly chosen the following key personnel to manage and coordinate the activities of the FCC Rural Health Care Pilot Program.

Key Personnel

The key personnel who will be directly involved with the successful management and implementation of the FCC Rural Healthcare Pilot Program are seasoned veterans who have served as pioneers in the field of telehealth. Each has similar, but unique attributes, that collectively provide the clinical, technical and business oversight required for the success of this program.

Introducing the VAST Management Team & Special Liaisons

Program Director: Karen Rheuban, M.D.

Technical Director: Eugene Sullivan, M.S.

Program Manager/VTN Liaison: Cynthia Barrigan, RN, MPH, Telehealth Strategies, LLC

Program Evaluation Manager: Jason Lyman, M.S, M.D. and Wendy Cohn, PhD

Special Liaisons:

Virginia Stroke Systems Task Force: Nina Solenski, M.D., VAST Stroke Coordinator

Secretary of Technology/State CIO: Karen Jackson, MBA

Brief biographical sketches are offered below for more information about the management team and its partners.

FCC Rural Healthcare Pilot - Program Director and Principal Investigator

Karen Rheuban, MD, Medical Director, Office of Telemedicine, UVA

Karen S. Rheuban, M.D. currently serves as Professor of Pediatrics, Senior Associate Dean for External Affairs and Continuing Medical Education and founding and current Medical Director of the Office of Telemedicine at the University of Virginia. As a pediatric cardiologist, Dr. Rheuban provides care to patients with congenital and acquired heart disease. Dr. Rheuban is a fellow of the American College of Cardiology and the American Academy of Pediatrics. She has regularly been listed in the "Best Doctors in America" database, and was recently recognized to be profiled in the National Library of Medicine's exhibit "Changing the Face of Medicine: Celebrating America's Women Physicians".

The Office of Telemedicine at the University of Virginia was developed to link remotely located patients and health professionals with the University's clinical consultative, research and educational expertise. UVA now serves as the hub of a 60 site telehealth network in the Commonwealth of Virginia, which includes community hospitals, rural and urban health department clinics, federally qualified health centers, a rural school system and correctional facilities, and partners with other academic health centers and international collaborations through its network. UVA annually supports more than 1200 consultative encounters with remotely located patients in more than 30 subspecialties, and offers additional teleradiology services, and a growing home telehealth initiative. UVA has broadcast thousands of hours of health professional and patient education through its telehealth program.

UVA serves as the Commonwealth of Virginia's Telehealth Resource Center, and has been awarded grants and contracts from the federal government, the Commonwealth, corporations and foundations to support the network.

Dr. Rheuban also oversees the University's Office of Continuing Medical Education. That office develops and sponsors thousands of hours of continuing medical education per year using multiple formats, such as lectures, conferences, 30 affiliated hospitals and through computer-assisted instructional materials and web-based on-line offerings.

She has served as a board member and Treasurer of the American Telemedicine Association and is Vice President Elect for the ATA. She is a board member and Vice Chair of Center for Telehealth and E-Health Law. She is a member of the Virginia Telehealth Network. She has presented Congressional testimony regarding telehealth to the Subcommittee on Health of the Committee on Energy and Commerce, to the Committee on Agriculture and to the Subcommittee on Africa and Global Health of the Committee on Foreign Affairs of the U.S. House of Representatives.

FCC Rural Healthcare Pilot - Technical Director for the UVA Telehealth NOC (Co-Investigator)

Eugene Sullivan, Director, MS, Office of Telemedicine, UVA

Born in 1945 and a native of Bloomfield, New Jersey, Mr. Sullivan is a graduate of Saint Peter's College earning a Bachelor of Science in Business Management. He is also a graduate of the University of Southern California with a Master's Degree in Systems Management. Upon graduation he was commissioned a Second Lieutenant in the United States Army. During his 22-year military career he saw combat in Viet Nam serving as a platoon leader in the 101st Airborne Division. Upon returning from Viet Nam Mr. Sullivan attended flight school and graduated in 1972. He is rated in both rotary and fixed

wing aircraft. His next assignment was to the Defense Intelligence College in Washington, DC. In 1984, then Major Sullivan was selected to serve as a staff officer with US Army Special Operations. In his final assignment he commanded a squadron of elite soldiers of the US Army's Special Operations Command. He retired in 1989 with the rank of Lieutenant Colonel. In April 1993, Mr. Sullivan was appointed to the faculty of University of Virginia, School of Medicine. His first task was to conduct a demonstration of Telemedicine and to proceed with research and development studies. The first demonstration took place in June 1993 using broadband fiber optic lines that linked the University of Virginia hospital with the Walter Reed Army Medical Center and an Army field hospital in Georgia. In 1996 the UVA Health System established the Office of Telemedicine as a clinical department and Mr. Sullivan was appointed its first Director. The Telemedicine program has expanded to over 60 sites throughout the Commonwealth. Remote site locations include rural hospitals, clinics, Department of Corrections prisons, a rural county school and a nursing home. The network stretches from Winchester in the north to Lee County in far southwest Virginia. Additionally, following the passage of the Telecommunications Act of 1996, Mr. Sullivan served as a Consultant to the FCC in the development of the regulations for the Rural Healthcare Support Mechanism and has provided many comments to the Notices of Proposed Rulemaking in regards to the Rural Healthcare Support Mechanism (FCC Docket 02-60). Mr. Sullivan is married to the former Cheryl Day and they have one daughter and two grandchildren.

FCC Rural Healthcare Pilot - Program Manager

Cynthia Barrigan RN, MPH, Founder & President, TeleHealth Strategies, LLC

Cynthia Barrigan has been providing leadership in the private/public and federal health care sectors for more than 15 years. She has dedicated her career to transforming the delivery of healthcare services to underserved and remote populations through the creative design of distributed health systems leveraging advancing information and telecommunications technologies.

As a telehealth pioneer, Ms. Barrigan has been instrumental in the design and development of telehealth systems for the United States military - a world leader and innovator in telemedicine/telehealth. She has led numerous initiatives that developed and integrated best medical practices with innovative technological capabilities which enabled healthcare providers at major medical centers to successfully share their expertise with those in remote and austere environments on a global-basis.

She has worked with all Department of Defense (DOD) services, the Veterans' Administration and Indian Health Services overseeing successful telehealth programs offering a range of health services including: dermatology, psychology, behavioral health, orthopedics, ENT, OB/GYN, dentistry, radiology, pediatrics,

ophthalmology and nursing. Through these efforts she gained extensive experience in virtually every aspect of telehealth life-cycle management including: strategic planning and analysis, development of business cases and cost-benefit analysis, policy development, functional requirements/systems analysis, software development and implementation, testing, user-training and program monitoring and evaluation.

Recently, Ms. Barrigan has worked on projects to integrate telehealth requirements/functionality into the military's electronic medical record—AHTLA—and led the joint development of DOD medical bandwidth requirements for theater-Iraq and Afghanistan. Through these and other DOD activities she has developed unique subject matter expertise in the design of telecommunication infrastructure for the efficient transfer of medical data and digital radiology images from austere environments back to mainstream military and veteran health care systems.

Ms. Barrigan is a registered nurse, specializing in emergency and critical care services and a former Captain in the US Army Nurse Corps. She also served as a Congressional staffer covering federal health care, including telehealth/telemedicine and related telecommunications legislation, in the US House of Representatives. Along with the design and implementation of telehealth systems, she has managed several large government contracts responsible for reporting on cost, schedule and performance, some of which were funded by Congressional appropriations.

An active member of the American Telemedicine Association (ATA) since 1996, Ms. Barrigan strives to continuously highlight and report on pivotal issues surrounding the integration of new clinical business practices and systems into mainstream health care delivery. She is also a member of the American Public Health Association and the American Medical Informatics Association.

Ms Barrigan received her Bachelor of Science in Nursing from the University of Florida, and is an honor graduate from the Johns Hopkins School of Public Health with special studies in international health and humanitarian and health information systems.

FCC Rural Healthcare Pilot - Program Evaluation Manager

Jason A. Lyman, M.D., M.S., Assistant Professor, Division of Clinical Informatics and Medical Director, Clinical Data Repository, Department of Health Evaluation Sciences

Dr. Lyman is an Assistant Professor of Clinical Informatics in the Department of Public Health Sciences with expertise in a wide range of medical informatics areas, including data warehousing, physician order entry, the relationship of information technology to patient safety, and evaluation methods for health

information technology. He completed an internship in pediatrics at the University of California at San Francisco and a two-year fellowship in medical informatics at Oregon Health and Science University under the mentorship of Drs. William Hersh and Kent Spackman. He is currently Medical Director of the Clinical Data Repository project, teaches informatics and database design in the Department of Public Health Sciences, and is a consultant for multiple informatics research efforts, both within and beyond the University of Virginia. He is particularly interested in the use of health information technology to assess and improve quality of care and patient safety, and is currently leading an institutional effort to develop a computer-based adverse drug event monitor for our hospitalized patients. Dr. Lyman has conducted multiple evaluation efforts related to health information technology, providing consulting services to Epocrates, Inc., McGraw Hill, and the British Medical Journal. Dr. Lyman will lead the evaluation effort for this project. He will develop the necessary instruments for use in the evaluation, oversee data collection, and conduct the analysis. In addition, he will be responsible for the final preparation of all evaluation reports and documents.

FCC Rural Healthcare Pilot - Program Evaluation Assistant

Wendy F. Cohn, PhD., Associate Professor, Department of Public Health Sciences, Director of the UVA Consumer Health Institute

Wendy F. Cohn is an Associate Professor of Public Health Sciences with expertise in the evaluation of health care programs and information technologies. She holds a PhD in Evaluation Research. She has led both development and evaluation projects related to in the area of health information technology. Among these projects is Health Heritage, a Web-based tool for providing patient health risk assessment based on family medical history.

Dr. Cohn has also provided evaluation services for hospitals, health departments, educators and publishers. She is a teaching faculty member in the MS and MPH programs at the University of Virginia. She provides course work and supervision in the area of evaluation in public health, health education and informatics. Dr. Cohn is currently teaching a 3-credit course "Evaluation Methods in Public Health and Health Informatics" in the Master's Program.

Dr. Cohn will assist Dr. Lyman in the development of the evaluation plan. Specifically, she will develop the process and/or implementation evaluation components. She will review all data collection instruments; and analysis. Dr. Cohn will also assist in the preparation of reports and presentation of findings.

FCC Rural Healthcare Pilot - Physician Liaison to the Virginia Stroke Systems Task Force**Nina J. Solinski, M.D., Associate Professor of Neurology**

Dr. Solinski is a dual Boarded Stroke Neurologist (General and Vascular Neurology), on staff in the Department of Neurology at University of Virginia. She completed a 3-year clinical and research Cerebrovascular Fellowship training in 1996, and has been a member of the UVA Primary Stroke Center Team since that time. She is currently an Associate Professor in the Department of Neurology with interests in Stroke Clinical Trials (participated, designed or directed > 25 clinical trials to date) and translational research. Stroke research interests include testing and the development of neuroprotective treatment strategies following stroke including drug development, and understanding the neurochemistry of stroke. As an Attending educator she is involved in nursing, resident, and fellow stroke training, as well as peer stroke-related teaching activities (international, national and statewide).

In 2005 to present, she served as the Leader of the Virginia Stroke Systems of Care Task Force and has actively led the development of the statewide program since its initiation. Having worked closely with the program she will bring expertise to the regional challenges to health equality that the state faces. She will provide stroke neurologic expertise to the VAST by providing guidance to the selected sites as they develop their institutional programs. Quality assurance and outcome is a central theme of the stroke continuum of care, and she will ensure that national stroke guidelines are followed, and the telehealth services are fully utilized and the outcome is analyzed.

FCC Rural Healthcare Pilot - Liaison to Secretary of Technology and CIO**Karen R. Jackson, MBA, Director of the Commonwealth's Office of Telework Promotion and Broadband Assistance**

In September 2006, Ms. Jackson was appointed to serve as Director of the Commonwealth's Office of Telework Promotion and Broadband Assistance. In this capacity she is responsible for advancing the usage of teleworking and alternative work schedules by both the public and private sector. Additionally, she is charged with developing and deploying programs aimed at solving the connectivity needs of businesses and underserved communities often serving as a catalyst for the formation of innovative partnerships between educational institutions, industry, and the public sector to accelerate the process.

Prior to assuming her current post, Ms. Jackson served as the Vice President of Broadband Programs for the Center for Innovative Technology where she developed and implemented programs to assist communities obtain the broadband telecommunication technologies needed to support economic development, healthcare, and education.

Ms. Jackson has participated in numerous broadband projects and in 2003 was awarded a grant from the Department of Commerce to conduct broadband demand assessments and education in Southside Virginia. In 2005, she is convened the first meeting of the Governor's Broadband Advisory Roundtable to assist in the development of broadband related legislation and policy.

Ms. Jackson holds a bachelor of science in business management from Christopher Newport University and a master of business administration from The College of William and Mary.

Representative Past Performance

The scope and requirements for managing the FCC Rural Healthcare Pilot Program are very similar in nature to contract and grants managed by Key Personnel on previous occasions. The following lists specific examples of past performance:

Dr. Rheuban has served as the principal investigator on multiple successful federal, state and corporate and foundation grants:

Organization: Department of Commerce, NTIA 1997-2002

Role: PI

Type of Award: Grant

Size of Award: \$412,270

Description: Established the SW Virginia Alliance for Telemedicine

Launched clinical telemedicine program in southwest Virginia linking hospitals and community health centers with UVA

Contact: Steve Downs, Administrator NTIA

Organization: USDA DLT program 1999-2004

Role: PI

Type of Award: Grant

Size of Award: \$232,000

Description: Expanded the SW Virginia Alliance for Telemedicine

Expansion of clinical telemedicine program in southwest Virginia linking hospitals and community health centers with UVA

Contact: Roberta Purcell, Asst Administrator, USDA

Organization: HRSA Office for the Advancement of Telehealth October 2002-September 2005

Role: PI

Type of Award: Grant

Size of Award: \$289,500

Description: Expanded the SW Virginia Alliance for Telemedicine

Expansion of clinical telemedicine program in southwest Virginia linking hospitals and community health centers with UVA

Contact: Dena Puskin, Director

Organization: Anthem Blue Cross-Blue Shield 2002-2007

Role PI

Type of Award: Grant

Size of Award: \$250,000

Description: Support for clinical services provided to uninsured or underinsured Virginians

Contact: Colin Drozdowski

Organization: NIH

UVA School of Nursing Rural Healthcare Resource Center

PI: Beth Merwin, PhD RN

Role: Dr. Rheuban serves on the Advisory Board

Description: School of Nursing project to enhance evaluation of rural healthcare services

Other UVA large federal projects with link to UVA Telemedicine:

Organization: National Library of Medicine T-15 Training Grant in Medical Informatics "A Systems Engineering Focus on Medical Informatics" 2007-2012

PIs: Stephanie Guerlain, PhD, PI (Systems & Information Engineering, School of Engineering and Applied Sciences)

James H. Harrison, Jr., MD, PhD, co-director (Public Health Sciences, School of Medicine)

Type of Award: Training Grant in Medical Informatics

Role: Office of Telemedicine serves as program resource for training grant.

Cynthia Barrigan has served as a Co-investigator and program manager on several large government contracts.

Organization: US Air Force, 89th AW, Andrews, AFB

Role: Co-investigator & Program Manager (as a civilian contractor)

Period of Performance: July 04-Jan 06

Contract Type: DoD Congressional Appropriation, Cooperative Agreement (public/private partnership.

Size of Award: \$1M

Description: Responsible for cost, schedule, performance, operational oversight and technology deployment for a 2-part research initiative focused on developing advanced medical capabilities for the US military. Project 1 successfully designed, deployed and tested an emergency medical system (24 x 7 emergency medical support using telemedicine systems, flight attendant training, and medical kits) in a live environment over a period of one year aboard 20 AF aircraft undertaking over 700 missions. Project 2 developed a GPS-enabled, Web-based information system to identify and map medical assets/capabilities in Indonesia, Thailand and the Philippines for use by remote special operators.

Contact: Lt Col James Whitlock, Office of the Air Force Surgeon General

Email: james.whitlock@pentagon.af.mil

Organization: US Army Medical Research & Materiel Command, Fort Detrick, MD

Subordinate: Telemedicine & Advanced Technology Research Center (TATRC)

Role: Portfolio Manager of Operational Telemedicine Programs for Deployed Forces

Period of Performance: 2006-2007

Contract Size: Oversee a portfolio of contracts totaling over \$1M.

Description: Responsible for cost, schedule and performance as assistant to the COR

Name of POC: COL Ron Poropatich, MC, US Army

Email: Poropatich@tatrc.org

Project Planning

An initial project plan has been developed to guide the anticipated steps of the Pilot program. A detailed Plan will be developed upon notification of selection and definitive guidance and details from the FCC. In the meantime, assumptions have been made relative to how the Pilot will be conducted and serve as the basis for our project plan tasks.

FCC Pilot Project Plan		Schedule (months)					
#	Phase 1- Initiation	1	2	3	4	5-8	9-12
1	Management Team/Stakeholder Kick-off Meeting	X					
2	Conduct Site Surveys to revalidate approach	X					
3	Develop Statement of Work/RFP	X					
4	FCC Form 465 Upload (28 day waiting period)	X					
5	Review Contractor Proposals		X				
6	Select Contractor (s)		X				
7	Establish a Single Point of Contact at each Provider Site for Coordination	X					
	Phase 2- Planning						
8	Kick-off Meeting w/ Telehealth NOC & Contractors to establish business processes			X			
9	Formal FCC Pilot Kick-off (Healthcare Provider Reps & Technical Reps)			X			
10	Prepare detailed Project Plan	X		X			
11	Conduct Network Design Meetings to provide guidance and clarifications			X			
12	Establish a series of plans (implementation, procurement, QA etc).			X			
13	Review implementation, test and QA plans				X		
14	Faciliate site service agreements with VITA for connecting to the state-MPLS						
15	Develop Monitoring & Evaluation plan (M&E)			X			
	Phase 3- Installation & Testing						
16	Conduct Phased Implementations					X	
17	Conduct site visits					X	
18	Implement M&E Plans					X	
19	Request project plans be routinely updated					X	
	Phase 4: Implementation						X
20	Schedule "Go-live" - Telehealth NOC/ Northrop Grumman Provide Support						X
21	QA network performance						X
22	Continue M&E						X
23	Collect Performance Evaluation Data						X
24	Survey Customers for Satisfaction						X

Table 2 - Project Plan

Summary

The University of Virginia Office of Telemedicine, along with its chosen partners, is dedicated to the successful deployment of broadband infrastructure and the development of a state-wide telehealth network. A qualified management team has been chosen and a management plan and quality controls are in place. UVA believes it is well-positioned and prepared to conduct a successful Pilot Program. UVA will adhere to the guidelines for competitive bids for telecommunications services, and network design.

7.0 COST PROPOSAL

Virginia has secured matching funds, dollar for dollar, as evidence of the strongest possible commitment of the Commonwealth to this initiative.

Following is the budget detail and justification for the Virginia Acute Stroke Telehealth (VAST) Network being proposed for the Federal Communications Commission (FCC) for the Rural Health Care Pilot Program. We request \$1.71 million from the FCC, and offer \$1.66 million in matching funds, as strong evidence of the Commonwealth's commitment to this project. (\$1,158,000 of that amount is recurring costs in Year 1). We anticipate equal success in garnering funds for Year 2.

Our management and technical approach to the FCC Health Care Pilot Program is unique. Therefore, we will explain the nature of those costs.

Proposed Management Costs

Our VAST network will leverage the existing management and technical infrastructure of the Office of Telemedicine, and other highly qualified individuals to ensure the success of the Pilot. It should be noted that our overall management and technical approach are inter-related. Under our proposed network roll-out, the Telemedicine Office will in fact be the deployment agent and the owner-operator of the VAST Telehealth NOC as described in Section 4. Therefore, management personnel have been included in this cost proposal as it relates to overseeing and managing the procurement of equipment, deploying, supporting and maintaining the infrastructure of the VAST network (except for Northrop Grumman sites which will be managed slightly differently). Travel costs have been included for UVA network engineers to travel to provider sites to conduct installation and maintenance.

Matching Funds

The **Virginia Department of Housing and Community Development (DHCD)** is committed to creating safe, affordable, and prosperous communities to live, work and do business in Virginia. DHCD partners with Virginia's communities to develop their economic potential, regulates Virginia's building and fire codes, provides training and certification for building officials, and invests more than \$100 million each year into housing and community development projects throughout the state - the majority of which are designed to help low-to-moderate income citizens. Amongst the many projects funded by DHCD include partnerships with communities to build medical clinics, telemedicine programs and

broadband deployment. DHCD will provide matching funds toward the deployment of fiberoptic infrastructure to the communities of the Eastern Shore of Virginia of **up to \$1.4 million**.

Aside from the Commonwealth investments in Network Virginia and COVANET, the **Virginia Tobacco and Community Revitalization Commission** is the largest single source of funding for telecommunication projects in the Commonwealth. Recognizing that robust infrastructure and affordable connectivity is paramount to economic development the Commission has concentrated their funding on the construction and lighting of open access fiber networks throughout the Southside and Southwest Virginia Tobacco Counties. To date, the Tobacco Commission has provided more than \$65 million dollars in funding and has partnered with localities and providers throughout the region to bring the dream of economic parity to fruition. Partners to date include: Cumberland Plateau and LENOWISCO Planning Districts, Bristol Virginia Utilities, Mid-Atlantic Broadband Cooperative, Citizen's Telephone, and Scott County Telephone to deploy fiber from Lee County (far Southwest Virginia) to Emporia . Acknowledging the role that access to quality healthcare plays in the viability and sustainability of rural communities, the Commission has chosen to be a partner in VAST, providing **up to \$750,000** in matching funds to be used for their eligible communities.

Counties and Cities Eligible for Virginia Tobacco and Community Revitalization Commission

Amelia	Franklin
Appomattox	Greensville
Bedford	Halifax
City of Bedford*	Henry
Brunswick	Lunenburg
Buckingham	City of Martinsville*
Campbell	Mecklenburg
Charlotte	Nottoway
Cumberland	Patrick
City of Danville	Pittsylvania
Dinwiddie	Prince Edward
City of Emporia*	Sussex

*Cities are eligible for all Commission funding sources **except** Southside Economic Development.

Southwest Localities

Economic Development monies are available to all southwest counties, cities or towns located within the region without regard to specific tobacco-related criteria

Bland	Norton City
-------	-------------

Bristol City	Russell
Buchanan	Scott
Carroll	Smyth
Dickenson	Tazewell
Floyd	Washington
Galax City	Wise
Grayson	Wythe
Lee	All Towns

Table 3 - Counties and Cities Eligible for Virginia Tobacco and Community Revitalization Commission

Following is the budget detail and justification for the Virginia Acute Stroke Telehealth (VAST) Network being proposed for the Federal Communications Commission (FCC) for the Rural Health Care Pilot Program.

FCC Rural Health Care Pilot Program Budget

Facility	Bandwidth	FCC Request	Dept of Housing and Community Development	Virginia Tobacco Commission	Total Project
Southside Community Hospital (Centra Health)	existing 100M	40,000			40,000
Bath County Community Hospital (Critical Access Hospital)	install MPLS	46,000			46,000
Carilion Stonewall Jackson Hospital (Critical Access Hospital)	DS1	7,000			7,000
Page Memorial Hospital (Critical Access Hospital)	DS1	10,000			10,000
Rockingham Memorial Hospital	DS1	7,000			7,000
Shenandoah Memorial Hospital (Valley Health/Critical Access Hospital)	DS1	10,000			10,000
Carilion Giles Memorial Hospital (Critical Access Hospital)	install MPLS	46,000			46,000
Dickenson County Medical Center (Critical Access Hospital)	DS1	10,000			10,000
Pulaski Community Hospital	install DS1	10,000			10,000
Smyth County Community Hospital	DS1	10,000			10,000
Rappahannock General Hospital	DS1	8,000			8,000
Augusta Medical Center	existing 100M	25,000			25,000
Danville Regional Medical Center	install 2 DS1	19,000		1,000	20,000
Halifax Regional Hospital	3 DS1	40,000			40,000
Lynchburg General Hospital (Centra Health)	existing 100M	40,000			40,000
Buchanan General Hospital	install MPLS	43,000		3,000	46,000
Carilion New River Valley Medical Center	install DS1	9,000		1,000	10,000
Carilion Roanoke Memorial Hospital	spt existing	40,000			40,000
Johnston Memorial Hospital	MPLS local fiber	43,000		103,000	146,000
Norton Community Hospital	install 2d DS1	19,000		1,000	20,000
Twin County Regional Hospital	DS1	10,000			10,000
Shore Memorial Hospital	NG install MPLS	46,000			46,000
University of Virginia Medical Center	install 45M MPLS	73,000			73,000
VCU Health System	100M	50,000			50,000
Winchester Medical Center (Valley Health)	DS3	50,000			50,000
Sentara Norfolk General	DS3	50,000			50,000
Sentara Virginia Beach General Hospital	DS3	50,000			50,000
Blue Ridge Medical Center	install DS1	10,000			10,000
Boydton Community Health - Halifax Family Health Center	install DS1	9,000		1,000	10,000
Johnson Health Center	install DS1	9,000		1,000	10,000
Piedmont Access to Health Services - Community Health Center of Danville	install DS1	9,000		1,000	10,000
Southwest Virginia Community Health - Saltville Medical Center	DS1	9,000			9,000
Southwest Virginia Community Health - Troutdale Medical Center	DS1	9,000			9,000
Southwest Virginia Community Health - Twin City Medical Center	DS1	9,000			9,000
Stone Mountain Health Services - Appalachia Family Health Center	DS1	10,000			10,000
Stone Mountain Health Services -Haysi Clinic	DS1	10,000			10,000
Eastern Shore Rural Health - Atlantic Community Health Center	NG install MPLS	46,000			46,000
Eastern Shore Rural Health - Bayview Community Health Center	NG install MPLS	46,000			46,000
Eastern Shore Rural Health - Onley Community Health Center	NG install MPLS	46,000			46,000
Internet2/Lambda Rail	VT connection	35,000			35,000
Installation and recurring monthly costs for broadband communications for above facilities		1,068,000	0	112,000	1,180,000

Facility	Bandwidth	FCC Request	Dept of Housing and Community Development	Virginia Tobacco Commission	Total Project
Shore Memorial Hospital	Local loop build out	10,000			10,000
Atlantic Community Health Center	Local loop build out	60,000			60,000
Bayview Community Health Center	Local loop build out	40,000			40,000
Onley Community Health Center	Local loop build out	10,000			10,000
Eastern Shore backbone Dept. of Housing and Community Development	Backbone buildout		1,400,000		1,400,000
Fiber build out and the local loop connections on the Eastern Shore		120,000	1,400,000	0	1,520,000
OPTIONAL Emergency Medical Services sites- Comms, Connectivity, 8 Cisco 2811 Routers (Clintwood, Marion, South Boston, Grundy, Abingdon, Norton, Galax, Martinsville)		80,000		40,000	120,000
Telehealth NOC (OTPS)					
On Call Support 24/7		26,000			26,000
USAC Compliance Outsource		27,000			27,000
MPLS Network Analysis & Migration Studies		100,000			100,000
Travel, Installation, Training		16,000			16,000
Outreach		5,000			5,000
8 Cisco 2800 routers and 1 Cisco 3800 router/gateway				50,000	50,000
Personnel					
Program Director .2 FTE		66,639			66,639
Senior Technical Engineer-Telehealth NOC .2 FTE		26,076			26,076
Fiscal /Admin/Audit/Review .25 FTE		14,388			14,388
VAST Physician Coordinator .05 FTE		7,788			7,788
VAST Project Evaluator .5 FTE		30,085			30,085
Senior Project Manager- Telehealth NOC		80,000			80,000
Administrative support-Telehealth NOC		50,000			50,000
Network Engineer 1 FTE Telehealth NOC				65,500	65,500
Personnel Total		274,976		65,500	340,476
Total OTPS		174,000		50,000	224,000
Grand Total		1,716,976	1,400,000	267,500	3,384,476



COMMONWEALTH of VIRGINIA

DEPARTMENT OF
HOUSING AND COMMUNITY DEVELOPMENT
Division of Community DevelopmentTimothy M. Kaine
GovernorPatrick O. Gottschalk
Secretary of
Commerce and TradeWilliam C. Shelton
Director

May 1, 2007

Dr. Karen Rheuben
Office of Telemedicine
University of Virginia
1214 Lee Street
Room 1878
Charlottesville, Virginia 22908

Dear Dr. Rheuben:

I am very glad to learn of your application to the FCC for broadband deployment for health care facilities on the Eastern Shore of Virginia. As you know our Department has been interested in rural health care, particularly telemedicine and its impact on rural communities.

Our Department has been provided funding to assist in the installation of fiber optic "backbone" in rural areas of Eastern Virginia. If your application is funded, we will make the Eastern Shore our top priority. We will provide \$1,400,000 to Mid Atlantic Broadband Cooperative to install fiber from the "megapop" at Wallops Island to Route 13 and south through Nassawadox, Onley and Bayview, thereby providing affordable, reliable, high speed connectivity to the hospital and three clinics included in your proposal.

Good luck on this highly important project!

Sincerely,

Bill Shelton



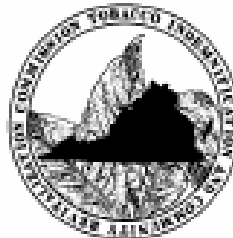
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The Honorable Charles R. Hawkins
Chairman

The Honorable Terry G. Kilgore
Vice Chairman



804-225-2027
Phone

1-877-807-1086
Toll Free

804-786-3210
Fax

Virginia Tobacco Indemnification and Community Revitalization Commission

701 E. Franklin Street, Suite 501 • Richmond, Virginia 23219

April 27, 2007

Karen S. Rheuban MD
Medical Director of Telemedicine
University of Virginia Health System
P.O. Box 800707
Charlottesville, Virginia 22908

Dear Dr. Rheuban:

I am pleased to provide this letter in support of The Commonwealth's proposal for funds associated with the Federal Communication Commission's Universal Service Fund for Rural Health Care Providers.

This letter also serves to affirm that on April 26, 2007 the Tobacco Commission approved a grant award of \$750,000 as matching funds to this proposal. Tobacco Commission funds are to be used upon successful award of FCC grant funds, and only for capital project costs (e.g. construction, materials, equipment) for healthcare facilities located within the 41 Southside and Southwest Virginia localities that are defined as the tobacco growing region. A map of the Tobacco Commission's service area is on our website (www.vatobaccocommission.org). Please be aware that, due to the source of our funds (tax exempt bonds), they may not be used for non-capital operating expenses such as ongoing connectivity or indirect project costs.

With this funding commitment, our Commissioners clearly stated that the proposed telemedicine project is highly supportive of and consistent with the Tobacco Commission's mission to revitalize the economic base of this region, and with our strategic initiatives to create robust, affordable, open-access high speed connectivity for use by businesses, institutions and government. We look forward to being a partner in the successful implementation of this important rural development project.

Sincerely,

Neal E. Noyes
Executive Director

8.0 CONCLUSION

Through this application we have provided a comprehensive view of how Virginia Acute Stroke Telehealth (VAST) and the work that is supporting it meets and exceeds the criteria set out by the FCC for the Pilot Program.

On behalf of the Commonwealth of Virginia, the Office of Telemedicine of the University of Virginia Health System would like to thank the Federal Communications Commission for its review and consideration of this application for funds under the Rural Health Care Pilot Program. The timing and requirements of the Pilot Program are a very good fit with the telehealth initiatives that have been underway in Virginia for the past four years through the Virginia Telehealth Network – a collaboration of telehealth stakeholders from throughout the Commonwealth. The Pilot Program has become the catalyst for turning the vision of the last four years into reality through the development of the Virginia Acute Stroke Telehealth (VAST) network.

APPENDIX A – SITE LIST

Site ID #	Hospital/Facility	Street Address	Zip	Phone	RUCA Code
Levels 1/2 - Primary Stroke Center (PSC) Hub Sites					
76	University of Virginia Medical Center	1215 Lee Street	22908	434-924-0211	1
77	Virginia Commonwealth University Health System	401 North 12th Street	23298	804-828-7715	1
81	Winchester Medical Center	1840 Amherst Street	22604	540-536-8000	1
63	Sentara Norfolk General Hospital	600 Gresham Drive	23507	757-388-3000	1
65	Sentara Virginia Beach General Hospital	1060 First Colonial Road	23454	757-395-8000	1
Level 3 - Standard of Care					
2	Augusta Medical Center	78 Medical Center Drive	22939	540-332-4000	6
26	Danville Regional Medical Center	142 South Main Street	24541	434-799-2100	1
29	Halifax Regional Hospital	2204 Wilborn Avenue	24592	434-517-3100	7
40	Lynchburg General Hospital	1901 Tate Springs Road	24501	434-947-3000	1
11	Buchanan General Hospital (Centra Health)	Slate Creek Road - Route 83	24614	276-935-1199	10
15	Carilion New River Valley Medical Center	2900 Lamb Circle	24073	540-731-2000	2
17	Carilion Roanoke Memorial Hospital	1906 Bellevue Avenue	24033	540-981-7000	1
37	Johnston Memorial Hospital	351 Court Street NE	24210	276-676-7000	4
47	Norton Community Hospital	100 Fifteenth Street NW	24273	276-679-9600	7
75	Twin County Regional Hospital	200 Hospital Drive	24333	276-236-8181	7
68	Shore Memorial Hospital	9507 Hospital Avenue	23413	757-414-8000	10
Level 4 - Initial Entry Access (IEA)					
71	Southside Community Hospital (Centra Health)	800 Oak Street	23901	434-392-8811	7
3	Bath County Community Hospital (Critical Access Hospital - CAH)	Route 220 North	24445	540-839-7059	10
73	Carilion Stonewall Jackson Hospital (Critical Access Hospital - CAH)	1 Health Circle	24450	540-458-3300	7
48	Page Memorial Hospital (Critical Access Hospital - CAH)	200 Memorial Drive	22835	540-743-4561	7
58	Rockingham Memorial Hospital	235 Cantrell Avenue	22801	540-433-4100	1
67	Shenandoah Memorial Hospital (Critical Access Hospital - CAH)	759 South Main Street	22664	540-459-4021	7
14	Carilion Giles Memorial Hospital (Critical Access Hospital - CAH)	1 Taylor Avenue	24134	540-921-6000	10
27	Dickenson County Medical Center (Critical Access Hospital - CAH)	312 Hospital Drive	24228	276-926-0300	10
51	Pulaski Community Hospital	2400 Lee Highway	24301	540-994-8100	7
18	Smyth County Community Hospital	565 Radio Hill Road	24354	276-782-1234	7
53	Rappahannock General Hospital	101 Harris Drive	22482	804-435-8000	10

Site ID #	Hospital/Facility	Street Address	Zip	Phone	RUCA Code
Community Health Centers					
101	Blue Ridge Medical Center	4038 Thomas Nelson Hwy	22922	434-263-4000	10
102	Halifax Family Health Center (Boydton Community Health)	2232 Wilborn Avenue	24592	434-572-4378	7
103	Johnson Health Center	320 Federal Street	24504	434-947-5967	1
104	Community Health Center of Danville (Piedmont Access to Health Services)	800 Memorial Drive, Suite D	24541	434-791-4122	1
105	Clinch River Health Services	Highway 65	24245	276-467-2201	2
106A	Saltville Medical Center (Southwest Virginia Community Health)	308 West Main Street	24370	276-496-4433	6
106B	Troutdale Medical Center (Southwest Virginia Community Health)	67 High Country Lane	24378	276-677-4187	10
106C	Twin City Medical Center (Southwest Virginia Community Health)	2195 Euclid Avenue	24201	276-669-5179	1
106D	Appalachia Family Health Center (Stone Mountain Health Services)	507 West Main Street	24216	276-565-2760	7
106E	Haysi Clinic (Stone Mountain Health Services)	102 Oquinn Drive	24256	276-865-5121	10
107A	Atlantic Community Health Center (Eastern Shore Rural Health)	8034 Lankford Hwy	23416	757-824-5676	9
107B	Bayview Community Health Center (Eastern Shore Rural Health)	22214 South Bayside Road	23316	757-331-1086	10
107C	Onley Community Health Center (Eastern Shore Rural Health)	20280 Market Street	23417	757-787-7374	10

Virginia Acute Stroke Telehealth (VAST) Project - Use Case #1 EMS Site List

Site ID #	Hospital/Facility	Street Address	Zip	Phone	RUCA Code
A	Clintwood Volunteer Rescue Squad	184 Volunteer Avenue	24228	276-926-1604	10
B	Galax-Grayson EMS	111 East Grayson Street	24333	276-236-3441	7
C	Halifax County Rescue	700 Hamilton Boulevard	24592	434-572-3960	7
D	Haysi Rescue Squad	214 Sandlick Road	24256	276-865-4610	10
E	Marion Life Saving Crew	230 South Park Street	24354	276-783-4526	7
F	Norton Rescue Squad	1710 West Main Avenue, SW	24273	276-679-0423	7
G	Saltville Rescue Squad	126 Battleground Avenue	24370	276-496-4531	10
H	Washington County Life Saving Crew	234 Park Street	24210	276-676-2401	4

Virginia Acute Stroke Telehealth (VAST) Project with Use Case #1 Emergency Medical Services (EMS) Sites

05/02/07

ID#	EMS	RUCA	Type	ID#	EMS	RUCA	Type
A	Clinrwood Volunteer Rescue Squad	10	EMS	E	Marion Life Saving Crew	7	EMS
B	Galax-Grayson EMS	7	EMS	F	Norton Rescue Squad	7	EMS
C	Halifax County Rescue	7	EMS	G	Salzville Rescue Squad	10	EMS
D	Haystack Rescue Squad	10	EMS	H	Washington County Life Saving Crew	4	EMS

ID#	Hospital	RUCA	Level	ID#	Community Health Center	RUCA	Type
2	Augusta Medical Center	6	3	101	Blue Ridge Medical Center	10	CHC
3	Bath Community Hospital (CAH)	10	4	102	Halifax Family Health Center	7	CHC
11	Buchanan General Hospital	10	3	103	Johnson Health Center	1	CHC
14	Carlisle Giles Memorial Hospital (CAH)	10	4	104	Community Health Center of Danville	1	CHC
15	Carlisle New River Valley Medical Center	2	3	105	Clinch River Health Services	2	CHC
17	Carlisle Roanoke Memorial Hospital	1	3	106A	Salzville Medical Center	6	CHC
19	Smyth County Community Hospital	7	4	106B	Troutdale Medical Center	10	CHC
26	Danville Regional Medical Center	1	3	106C	Twin City Medical Center	1	CHC
27	Dickenson County Medical Center (CAH)	10	4	106D	Appalachia Family Health Center	7	CHC
29	Halifax Regional Hospital	7	3	106E	Haystack Clinic	10	CHC
37	Johnston Memorial Hospital	4	3	107A	Atlantic Community Health Center	9	CHC
40	Lynchburg General Hospital	1	3	107B	Bayview Community Health Center	10	CHC
47	Norton Community Hospital	7	3	107C	Onley Community Health Center	10	CHC
48	Page Memorial Hospital (CAH)	7	4				
51	Pulaski Community Hospital	7	4				
53	Rappahannock General Hospital	10	4				
58	Rockingham Memorial Hospital	1	4				
63	Sentara Norfolk General Hospital	1	PSC				
65	Sentara Virginia Beach General Hospital	1	PSC				
67	Shenandoah Memorial Hospital (CAH)	7	4				
68	Shore Memorial Hospital	10	3				
71	Southside Community Hospital	7	4				
73	Carlisle Stonewall Jackson Hospital (CAH)	7	4				
75	Twin County Regional Hospital	7	3				
76	University of Virginia Medical Center	1	PSC				
77	Virginia Commonwealth University Health System	1	PSC				
81	Winchester Medical Center	1	PSC				

FCC Area



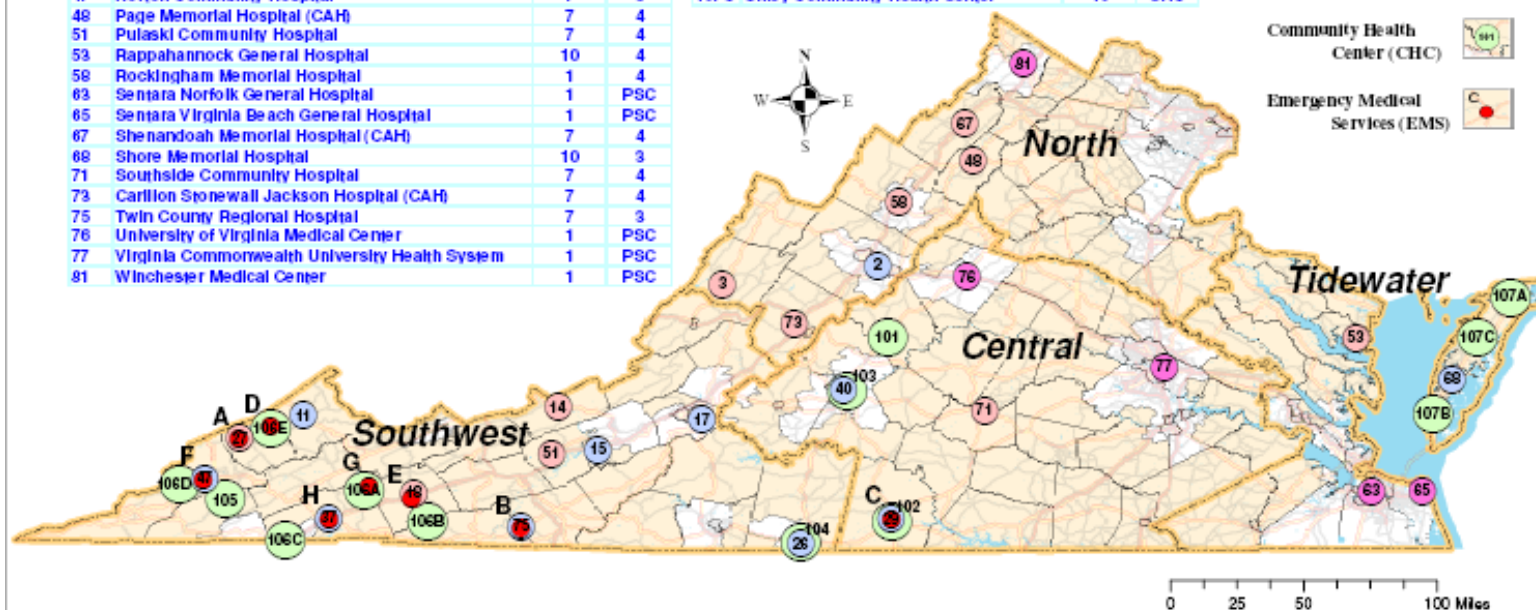
Region Boundaries

Primary Stroke Center
(PSC)

Level 3 - Hospital



Level 4 - Hospital

Community Health
Center (CHC)Emergency Medical
Services (EMS)

05/02/07

Virginia Acute Stroke Telehealth (VAST) Project Sites

ID#	Hospital	RUCA	Level
2	Augusta Medical Center	6	3
3	Bath Community Hospital (CAH)	10	4
11	Buchanan General Hospital	10	3
14	Carilion Giles Memorial Hospital (CAH)	10	4
15	Carilion New River Valley Medical Center	2	3
17	Carilion Roanoke Memorial Hospital	1	3
18	Smyth County Community Hospital	7	4
26	Danville Regional Medical Center	1	3
27	Dickenson County Medical Center (CAH)	10	4
29	Halifax Regional Hospital	7	3
37	Johnston Memorial Hospital	4	3
40	Lynchburg General Hospital	1	3
47	Norton Community Hospital	7	3
48	Page Memorial Hospital (CAH)	7	4
51	Pulaski Community Hospital	7	4
53	Rappahannock General Hospital	10	4
58	Rockingham Memorial Hospital	1	4
63	Sentara Norfolk General Hospital	1	PSC
65	Sentara Virginia Beach General Hospital	1	PSC
67	Shenandoah Memorial Hospital (CAH)	7	4
68	Shore Memorial Hospital	10	3
71	Southside Community Hospital	7	4
73	Carilion Stonewall Jackson Hospital (CAH)	7	4
75	Twin County Regional Hospital	7	3
76	University of Virginia Medical Center	1	PSC
77	Virginia Commonwealth University Health System	1	PSC
81	Winchester Medical Center	1	PSC

ID#	Community Health Center	RUCA	Type
101	Blue Ridge Medical Center	10	CHC
102	Halifax Family Health Center	7	CHC
103	Johnson Health Center	1	CHC
104	Community Health Center of Danville	1	CHC
105	Clinch River Health Services	2	CHC
106A	Saltville Medical Center	6	CHC
106B	Troutdale Medical Center	10	CHC
106C	Twin City Medical Center	1	CHC
106D	Appalachia Family Health Center	7	CHC
106E	Haysi Clinic	10	CHC
107A	Atlantic Community Health Center	9	CHC
107B	Bayview Community Health Center	10	CHC
107C	Onley Community Health Center	10	CHC

FCC Area



Region Boundaries



Primary Stroke Center (PSC)



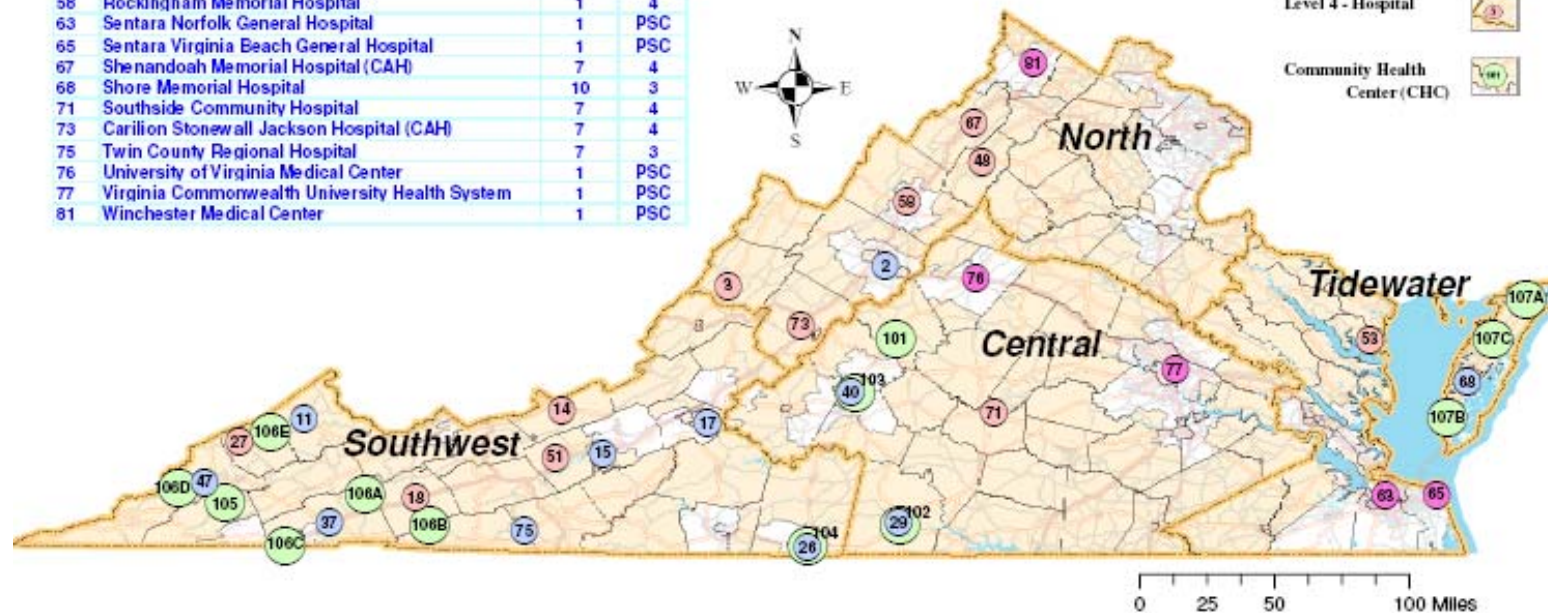
Level 3 - Hospital



Level 4 - Hospital



Community Health Center (CHC)



APPENDIX B – QUALIFICATIONS OF KEY PERSONNEL

BIOGRAPHICAL SKETCH			
NAME		POSITION TITLE	
Karen S. Rheuban		Professor	
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Ohio State University	MD	1974	Medicine
University of Virginia		1974-1977	Resident, Pediatrics
University of Virginia		1978-1980	Fellow, Ped Cardiology

Employment History

1980-present, Professor, Cardiology, Pediatrics, School of Medicine, University of Virginia
 1990-present, Associate Dean, Continuing Medical Education, School of Medicine, University of Virginia
 1994-present, Medical Director, Office of Telemedicine, School of Medicine, University of Virginia
 2004-present Senior Associate Dean for External Affairs and Continuing Medical Education

Memberships

Fellow, American Academy of Pediatrics
 Fellow, American College of Cardiology
 American Medical Association
 American Telemedicine Association, Board member, Treasurer, 2007 Vice President
 Center for Telehealth and E-Health Law, Board member and Vice Chair
 Advisory panelist: AHRQ Telehealth Consensus Panel
 Director, Virginia Telehealth Resource Center (Contract: Center for Innovative Technology, Broadband division)

Research Projects Ongoing or Completed During the Last Five Years

1. "Southwest Virginia Alliance for Telemedicine". Karen S. Rheuban, PI. Sponsor: United States Department of Commerce (DOC). Oct 1, 1997-December 31, 2002. #51-60-97044-NTIA
Develop and deploy a broadband telemedicine network for the clinical consultations and distance learning in medically underserved regions of Virginia.
2. "Southwest Virginia Alliance For Telemedicine". Karen S. Rheuban, PI. Sponsor: Virginia Healthcare Foundation. Jul 1, 1998-Jun 30, 2002. #GF10171
Develop and deploy a broadband telemedicine network for the clinical consultations and distance learning in medically underserved regions of Virginia.
3. "Southwest Virginia Alliance For Telemedicine". Karen S. Rheuban, PI. Sponsor: United States Department of Agriculture (USDA). Oct 28, 1999-January 11, 2004.

- Develop and deploy a broadband telemedicine network for the clinical consultations and distance learning in medically underserved regions of Virginia.
4. "Southwest Virginia Alliance For Telemedicine". Karen S. Rheuban, PI. Sponsor: United States Department of Agriculture (USDA). Oct 31, 2002 - September 20, 2003
Develop and deploy a broadband telemedicine network for the clinical consultations and distance learning in medically underserved regions of Virginia
 5. "Southwest Virginia Alliance for Telemedicine" Karen S. Rheuban, PI. Sponsor: HRSA: Office for the Advancement of Telehealth, October 1, 2002 - September 30, 2005. 1 D1B TM 00046-01
Develop and deploy a broadband telemedicine network for the clinical consultations and distance learning in medically underserved regions of Virginia.
 6. Virginia Department of Health, Karen S. Rheuban, Contract "Medicare Rural Flexibility Grant Program", Virginia Department of Health, 2003- 2007

Relevant Publications:

1. Sullivan E, Rheuban KS. UVA telemedicine program: improving access. *VA Med Qtrly*, 1996;123:179.
2. Rheuban, Karen S., Settimo, R, and Wispelwey, HIV/AIDS, Telehealth Technical Assistance Documents, U of Missouri Press, 2004
3. Rheuban, K, The University of Virginia Telemedicine Program: Serving Rural Virginians Regardless of Payer Status, Telehealth Practice Report; 2004 8(6):3.
4. Rheuban, K and Sullivan, E, Telemedicine, J. of Longterm Effects of Medical Implants, 2005 15:1, 49-55.
5. Innovative programs in Telemedicine, University of Virginia Health System, Office of Telemedicine, Telemedicine and E-Health; 2005 11:1 12-19.
6. In press: Rheuban, K, How can TM foster specific innovation in addressing specific health care challenges? Access, specialty shortages, changing patient care needs. ARHQ/CMS/Oregon Health Sciences University Consensus Conference, March 2005.
7. Congressional Testimony: Subcommittee on Health of the Energy and Commerce Committee, US House of Representatives, Sept, 2000.
8. Congressional Testimony: Committee on Agriculture, US House of Representatives, June 2003
9. Congressional Testimony: Subcommittee on Africa and Global Health, Committee on Foreign Affairs, May, 2006

Curriculum Vitae

Eugene V. Sullivan

Personal Information

Address: 1677 Octonia Road
Stanardsville, VA 22973

Phone: (434) 924 5470 (O)
(434) 985 8520 (H)

Internet: genes@virginia.edu

Born: December 18, 1945

Marital Status: Married

Military: Lieutenant Colonel, Retired, U.S. Army
Viet Nam Service 1968-69

Education

Date	School	Degree/Subject	Major
1981	United States Army Command and General Staff College Ft Leavenworth, KS	National military policy	
1976	University of Southern California, Los Angeles, CA	Systems Management	MS
1974	Defense Intelligence College, Washington, DC	Strategic Studies	
1967	Saint Peter's College, Jersey City, NJ	Business Management	BS

Present Position

Director

Office of Telemedicine
University of Virginia
Charlottesville, Virginia, 22908-0707

Professional History

University of Virginia Health System 1993 – Present
Director, Office of Telemedicine

Logicon Eagle Technology 1991 - 1993
Senior Systems Analyst responsible for Independent Verification and Validation of the All Source Analysis System.

Teledyne Brown Engineering 1989 - 1991
Senior Systems Analyst responsible for engineering testing on the All Source Analysis System.

United States Army 1967 - 1989
Retired Lieutenant Colonel

Battalion Commander, Special Forces Operational Detachment Delta 1986 - 1989

Staff Officer, United States Army Special Operations Command 1984 - 1986

Staff Officer, Headquarters, Department of the Army 1981 - 1984

Staff Aviation Officer, Headquarters United States Army Intelligence and Security Command 1978 - 1981

Command and staff positions in Germany, Korea, Viet Nam, and the United States 1967 - 1978

Professional Certifications

FAA certified commercial pilot, airplane multiengine, instrument and helicopter
2162344

Appointed Position

Member, Federal Communications Commission,
Telecommunications and HealthCare Advisory Committee, Washington, DC (6/96-present)

Publications

The University of Virginia Telemedicine Program: Serving Rural Virginians Regardless of

Payer Status, 2004, Karen S. Rheuban, M.D., Eugene Sullivan, M.S., Telemedicine Practice

Report, January/February 2004

International Real-Time Distance Science Education Between the United States
And Southern Africa, 2002, Stephen A. Macko, Thomas A. Szuba, Robert J.
Swap, Herman H. Shugart, Eugene Sullivan, Math and Science Education 2002

University of Virginia Telemedicine Program, Improving Access, 1996,
E. Sullivan, K. Rheuban, MD, Virginia Medical Quarterly Summer 1996

The Development of the Central Virginia Telemedicine Network (CVTN): A
Broadband Application, 1996, E. Sullivan, R. Settimo, A. Crosby

Case Study, University of Virginia Telemedicine Program. Fund for Rural
Education and Development, 1995, S. Koch, R. Falato, E. Sullivan

Intelligence in Support of Counterinsurgency Operations. Defense Intelligence
College, 1974, E. Sullivan

Presentations

- 2006 Virginia Rural Health Association, "Status of the Virginia Telehealth Network and the FCC Pilot Program" Natural Bridge, VA (11/06)
- 2006 Capitol Hill Steering Committee on Telehealth and Healthcare Informatics, "Integrating Telehealth Technologies Into Emerging HIT Networks" Washington, DC (10/06)
- 2006 Health Technology Fair, "Telemedicine: Reaching out to the citizens of the Commonwealth" Germanna Community College, Culpeper, VA (10/06)
- 2006 Telehealth Leadership Conference, "Telecom Issues and Rural Health Care" Washington, DC (3/06)
- 2005 Connecting Rural Health Communities Through Information Technology, "Universal Service Fund Support to Rural Healthcare" Butte, MT (10/05)
- 2005 Medical Missionaries Conference, "Telemedicine Technologies to support Remote Medical Care" Manassas, VA (5/05)
- 2005 American Telemedicine Association annual conference, "Update on Universal Service Support for Rural Health Care" Denver, CO (4/05)
- 2004 United States Department of Commerce report, panel member, "Innovation, Demand, and Investment in Telehealth" Capitol Hill, Washington, DC (2/04)
- 2002 Virginia Tech, Center for Wireless Telecommunications, Wireless Opportunities Workshop – "UVA Telemedicine Network and Wireless" Blacksburg, VA (9/02)
- 2002 United States Department of Agriculture, Rural Utilities Service Annual Conference – "Telemedicine in Rural Virginia" Orlando, FL (7/02)
- 2001 Southwest Virginia Graduate Medical Education Consortium - "Access on Air, Telemedicine in Southwest Virginia" Breaks, VA (10/01)
- 2001 Department of Computer Science, University of Virginia – "Telemedicine, the Internet and E-commerce" Charlottesville, VA (4/01)
- 2001 Bon Secours Memorial School of Nursing – "Innovations in Health Care in the 21st Century", Richmond, VA (5/01)
- 2001 Bed and Breakfast Association of Virginia – "Telemedicine, Reaching Your

- Community”, Richmond, VA (1/01)
- 2000 Telecon 2000 Conference and Expo – “Establishing a Financially Viable Telemedicine Program”, Anaheim, CA (via videoconference) (12/00)
- Page Memorial Hospital Medical Staff – “Telemedicine at the University of Virginia”, Luray, VA (6/00)
- 2000 Department of Computer Science, University of Virginia – “Telemedicine, the Internet, and e-commerce”. Charlottesville, VA (4/00)
- 1999 Consortium of Health Science Librarians – “Telemedicine, the Internet, and the University of Virginia”, Harrisonburg, VA (3/99)
- 1998 Pediatric Grand Rounds, Virginia Baptist Hospital – “Telemedicine at the University of Virginia”, Lynchburg, VA (11/98)
- 1998 4th Annual Southwest Virginia Internet Conference – “Telemedicine to Southwest Virginia”, Abingdon, VA (8/98)
- 1997 Federal Communications Commission and Healthcare Open Systems and Trials Meeting - moderator “The Role of Government in Telehealth Standards”, Washington, DC (7/97)
- 1997 Supercomm’97, International Engineering Consortium - “ATM Applications, Advances in Telemedicine”, New Orleans, Louisiana (6/97)
- 1997 Telemedicine for European Healthcare - “Assessing the Progress of Telemedicine in the US and Identifying Elements Transferable to Europe”, London, UK (1/97)
- 1996 GTE Lecture Series, James Madison University- “Telemedicine, Communications and Their Role in Education”, Harrisonburg, Virginia (11/96)
- 1996 Global Telemedicine and Federal Technologies - “The Central Virginia Telemedicine Network” and “The Federal Communications Commission, The Telecommunications Act of 1996”, Williamsburg, Virginia (7/96)
- 1996 Telemedicine 2000: Conference and Exhibition - “The Central Virginia Telemedicine Network, A Broadband Application”, Chicago, Illinois (6/96)
- 1996 Life Sciences and Space Medicine Conference - “Telemedicine and Broadband Communications”, Houston, Texas (3/96)
- 1995 Virginia Rural Health Association - “Telemedicine 1995”, Roanoke, Virginia (10/95)
- 1995 Congressman Thomas J. Bliley, Jr., Chairman House Commerce Committee - “Telemedicine at the University of Virginia”, Washington, DC (7/95)
- 1995 Health Staff, Senator Jay Rockefeller - “Telemedicine at the University of Virginia”, Washington, DC (7/95)
- 1995 Joint Commission for Health Care - “Telemedicine: Implications for Health Care in Virginia”, Richmond, Virginia (4/95)

1995 OPASTCO Winter Convention - "Using Telecommunications to Improve Rural Health Care", San Marco, Florida (1/95)

1994 Virginia Telecommunications Summit - "The Telemedicine Project at the University of Virginia", Irvington, Virginia (10/94)

Cynthia R. Barrigan, RN, MPH

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Centreville, Virginia 20120-3010
cbarrigan@telehealthstrategies.com

Cell: (703) 244-3460
Email:

PROGRAM MANAGER- PROFESSIONAL PROFILE***Innovative Leadership ~******Clinical & Research Expertise ~ Technology Development ~ Progressive Program Management***

Proven high-impact leader, pioneer, innovator and integrator in the health care field with 15 + years of diverse experience in the public and private health care sector. Results-oriented manager with proven successes in developing, managing, monitoring, and evaluating million dollar research and development projects for cost, schedule and performance. Strong track record of working in partnership with diverse organizations to develop requirements and solutions for addressing inequities in health services and gaps in medical resources.

Summary of Relevant Qualifications:

- Oversight and management of government research grants and cooperative agreements focused on health information systems and other remote emergency medical systems requirements.
- Systems Analyst with design, development, testing, implementation and mainstream integration of telehealth systems for the Department of Defense including business, policy and governance issues at all levels of the military health system.
- Entrepreneurial successes as founder and President of Telehealth Strategies, a remote health systems firm with commercial and government contracts aimed at developing remote and emergency medical systems on the ground, air and sea.
- Former US Army Nurse Corps Officer and Congressional staffer with management/policy expertise.
- Recent Masters in Public Health with an emphasis on international health and humanitarian systems.
- Seasoned Registered Nurse with front-line positions in a variety of clinical & research settings.
- Proven ability to build strategic alliances among diverse stakeholders working within and across complex organizations garnering financial support for programs to including Congressional appropriations.
- Excellent writing and presentation skills demonstrated in high-level executive and public settings.

PROFESSIONAL EXPERIENCE

TeleHealth Strategies, LLC, Centreville, Virginia
Present

2001-

Founder & President

TeleHealth Strategies (THS) facilitates the creation of remote health system capabilities for both the public and private sector with a special focus on the research and development of technology tools to enable distributed medical networks. THS partners with award-winning private sector and government organizations to seek funding for and execute special projects focused on innovating new healthcare technology applications and clinical business practices. THS provides subject matter expert consulting, research analysis, proposal/grant-writing and senior program management services for performance-based grants/contracts in the health systems domain. Services also include formulating the requisite business agreements, training plans and policy within and across diverse organizations to facilitate improvements in health service delivery. A new emerging focus area includes exploring opportunities for improving the management of disasters and complex humanitarian emergencies through better health information systems.

Select Sampling of Contracts & Services

- **Virginia Department of Health, Richmond, VA. Office of Health Policy & Planning**
 - Health systems analyst and planner for telehealth and rural health systems
 - Coordinating manager of the Virginia Telehealth Network
- **MedAire Inc., Tempe, AZ:** Global leader of in-flight & maritime medical preparedness & emergency response
 - Created and negotiated public-private partnerships focused on medical preparedness, surveillance and emergency response systems.
 - Designer, program manager and co-investigator for a 2004 \$1M Congressionally-appropriated research initiative (cooperative agreement) between MedAire and the US Air Force Surgeon General's Office.
- **VISICU, Inc., Baltimore, MD:** Developer of the Electronic Intensive Care Unit (e-ICU) model and remote telemedicine tools
 - Project management, implementation support, and end-user training for clinical personnel at Sentara Health System, Norfolk, Virginia (beta-test site) and New York-Presbyterian Hospital.
 - Government relations for Congressional appropriations.
- **Medweb Inc. San Francisco, CA:** Leader of tele-radiology platforms and distributed imaging capabilities
 - Project management for research and development project with US Army
 - Business and requirements analysis for expansion of platform to multi-specialty medical consultation for use in providing health services to deployed forces.

Government Contracts

- **US Army Research & Materiel Command (USA-MRMC), Fort Detrick, Maryland:**
 - Program management and Subject Matter Expert services to supporting the Army Medical Department's (AMEDD) telemedicine research strategies, plans and the portfolio of grants
 - Led the development of AMEDD telehealth requirements and the implementation of the Army's first formal teleconsultation service between Iraq and the AMEDD's medical centers worldwide
 - Planned, organized, garnered funding for and moderated the AMEDD's first Telehealth Summit
 - Actively involved with DoD telehealth issues at all levels to include Surgeons General (Army & Air Force)
- **Telemedicine & Advanced Technology Research Center, Fort Detrick, Maryland**
 - Manager for the Operational Telemedicine Portfolio- projects totaling over \$1M
 - Action officer for high-priority projects

Information Systems Support, Inc., Bethesda, Maryland
2001

1999-

Senior Program Manager & Telemedicine Clinical Director

Senior staff providing program management and clinical oversight for a Congressionally-sponsored \$40 million Department of Defense, health care technology research & development program office located at Tripler Army Medical Center in Hawaii. This position actually held for 4 years-see prior work with SRA.

Major Responsibilities

- Member of the Board of Directors responsible for strategic and financial planning
- Development of research requirements, agenda/portfolio, performance metrics
- Oversight, monitoring and evaluation of telemedicine grants for cost, schedule and performance
- Product development, testing, user training and implementation of candidate prototype applications
- Benefits assessment for health information systems technologies and electronic medical records

Selected Accomplishments

- Created and facilitated military clinical working groups in the re-engineering of the medical referral and consultation process in the Pacific Rim. Invented a new "process" and new Web-based software "product" which won the *Government Computer News Innovation in Technology Award, 1999*.

- Chosen as the US Army liaison to the Alaska Federal Healthcare Partnership. Presented a “Plan of Approach” for coordinating a joint federal telemedicine strategic plan for the State of Alaska.

SRA International, Fairfax, Virginia**1997-1999**

Senior Program Manager & Telemedicine Clinical Director (with duties described above).

Concurrent Technologies Corporation (CTC), Arlington, Virginia**1996–1997****Health Care Systems Analyst-Business Development**

Senior analyst and business development staff for a 501-3c non-profit systems integration company. Responsible for healthcare information technology market research and consulting services. Actively monitored the changes, needs and analyzed key trends occurring within the US health care delivery system and identified and tracked the development and utilization of emerging technologies for the management and delivery of a range of health care services. Provided consulting services to private sector healthcare clients in developing telemedicine strategic plans and applying for federal grants.

United States House of Representatives, Washington, DC**1995***Legislative Assistant, US Congressman Charles Wilson (Texas)*

Congressional staff responsible for analyzing and advising on US healthcare policy issues. Key areas of responsibility included, but not limited to Medicare, Medicaid, Veterans Healthcare, Rural Healthcare Issues and Women’s Health. Actively participated on the Congressional Rural Health Coalition addressing issues related to healthcare in underserved or remote areas. Monitored and reviewed telemedicine and telecommunications legislation and tracked industry activities and technology advancements related to the healthcare. Represented the Congressman’s positions to constituents, lobbyists, and other government officials.

United States Army, Walter Reed Army Medical Center, Washington, DC**1990-1995***Nurse Corp Officer: Rank: Captain (O-3)***Managing Director, Eisenhower Executive Nursing Suite (VIP Unit)**

Responsible for the planning, coordination and delivery of inpatient and outpatient health care services for senior General Officers, their spouses, members of Congress, Heads of State and designees of the Secretary of the Army to include global leaders. Supervised 20 staff members in delivery of health services.

Charge Nurse, General Surgical, Cardio-Thoracic, Medical & Pediatric Intensive Care Units

Special Assignments:

- Staff Officer, Emergency Medical Team, 85th General Field Hospital (Army field training)
- Officer in Charge, Walter Reed AMC, 1993 Presidential Inaugural
- Army Recruiting Spokesperson, Nurse Media Tour, 1992 (TV, radio & print campaign in Florida)

Shands Hospital, University of Florida Medical Center, Gainesville, Florida 1986-1990

Clinical & Research Positions

- Charge Nurse, Level II Trauma Center, Emergency Department, Shands Hospital, 1990
- Research Nurse Coordinator, Asthma Clinical Trials, Department of Pulmonary Medicine, 1989
- Research Nurse Coordinator, Congestive Heart Failure Clinical Trials, Department of Cardiology, 1987–1989

EDUCATION

Civilian

Johns Hopkins University, Baltimore, Maryland

Master of Public Health (MPH), International Health, Delta Omega Honor Society 2006

University of Florida, Gainesville, Florida

Bachelor of Science in Nursing 1986

Military

US Army, Intensive Care Nursing Course, Walter Reed Army Medical Center, Washington, DC 1991
US Army Officer Basic Course, Fort Sam Houston, San Antonio, Texas 1990

MILITARY AWARDS

Meritorious Service Medal 1995
Army Commendation Medal 1993
Army Achievement Medal 1993, 1994

National Defense Ribbon	1991
Army Service Ribbon	1990

LICENSURE

Florida State Board of Nursing, Registered Nurse #1747702	1986
Virginia State Board of Nursing, Registered Nurse # 0001146753	2006

PROFESSIONAL ASSOCIATIONS

American Telemedicine Association	1996
American Public Health Association	2004
American Medical Informatics Association	2006

BIOGRAPHICAL SKETCH

NAME Lyman, Jason	POSITION TITLE Assistant Professor		
eRA COMMONS USER NAME			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of Vermont, Burlington, VT	B.A.	1988-1992	Mathematics
University of Vermont College of Medicine, Burlington, VT	M.D.	1993-1997	Medicine
University of California at San Francisco, San Francisco, CA		1997-1998	Internship, Pediatrics
Oregon Health & Science University, Portland, OR	M.S.	1998-2000	Medical Informatics

Positions and Employment

- 2000-present Assistant Professor, Division of Clinical Informatics, Department of Health Evaluation Sciences, University of Virginia Health System, Charlottesville, VA
- 2002-present Medical Director, Clinical Data Repository, Department of Health Evaluation Sciences, University of Virginia Health System

Honors

- 1990 Phi Beta Kappa
- 2000 Diana Forsythe Award, for paper published in JAMIA Supplement, AMIA Proceedings, 2000:27-31

Selected peer-reviewed publications

1. Gorman, P., Ash, J., Lavelle M., **Lyman, J.**, Delcambre, L., & Maier, D. (2000). Bundles in the wild: Managing information to solve problems and maintain situation awareness. *Library Trends*, 49(2).
2. Ash J, Gorman P, Lavelle M, **Lyman J**, & Fournier L. (2001). Investigating physician order entry in the field: Lessons learned in a multi-center study. *MedInfo*, 10(Pt 2), 1107-11.
3. Ash, J. S., Gorman, P. N., Lavelle, M., **Lyman, J.**, Delcambre, L. M., Maier, D., Bowers, S., & Weaver M. (2001). Bundles: Meeting clinical information needs. *Bulletin of the Medical Library Association*, 89(3), 294-296.

Virginia Tobacco Settlement Foundation, Fund For Excellence In Science And Technology (FEST) 2001–2003

PUBLIIC- The Project to Understand Biologic Systems, Learn to Integrate, Interpret, and Communicate their Findings

Role: Co-lead of Requirements Analysis and Architectural Design Team

Academic Administrative Units in Primary Care
8/31/2006

Schorling (PI)

9/1/2005-

Department of Health and Human Services, Health Resources and Services Administration

SPARC is a Web-based tool to support housestaff training in practice-based learning and improvement by providing residents with population-based reports on their patient panel.

Role: Co-investigator, SPARC Project Director

BIOGRAPHICAL SKETCH

NAME Cohn, Wendy F.	POSITION TITLE Associate Professor		
eRA COMMONS USER NAME			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Hobart-William Smith Colleges, Geneva, NY	B.A.	1987	Psychology/Special Education
University of Virginia, Charlottesville, VA	M.Ed.	1991	Educational Psychology
University of Virginia, Charlottesville, VA	Ph.D.	1994	Evaluation Research

A. Positions and Employment

1987-1988 Teacher, The Boston Higashi School, Lexington, Massachusetts

1988-1990 Wilderness Instructor, Hurricane Island Outward Bound School, Hurricane Island, Maine

1991-1994 Research Associate/Health Care Evaluator, Institute for Substance Abuse Studies and Department of Psychiatric Medicine, University of Virginia, Charlottesville, Virginia

1994-1996 Assistant Professor, Department of Psychiatric Medicine, University of Virginia, Charlottesville, Virginia

1996-2006 Assistant Professor, Department of Public Health Sciences, Division of Health Services Research and Outcomes Evaluation, University of Virginia, Charlottesville, Virginia

2006-present Associate Professor, Department of Public Health Sciences, Division of Clinical Informatics, University of Virginia, Charlottesville, Virginia

B. Selected peer-reviewed publications

1. Brown, P., Kinzie, M., **Cohn, W.F.**, Lyman, J. (2006). Doctors' perceptions of information utility in neonatal intensive care. *Medical Education*, 40, 459-460.
2. Arnos, K. S., Della Rocca, M. G., Karchmer, M. A., Culpepper, B., & **Cohn, W. F.** (2004). Genetics content in the graduate audiology curriculum: A survey of academic programs. *American Journal of Audiology*, 13, 126-134.
3. **Cohn, W. F.**, Ropka, M. E., Jones, S. M., & Miesfeldt, S. (2003). Information needs about hereditary breast cancer among women with early-onset breast cancer. *Cancer Detection and Prevention*, 27(5), 345-52.
4. **Cohn, W. F.**, Einbinder, L., Attridge, E., & Lord, J. (2003). Evaluating a health information resource in a health system. *Proceedings AMIA Symposium*, 3, 818.
5. Miesfeldt, S., **Cohn, W. F.**, Jones, S. M., Weinstein, J. C., & Ropka, M. E. (2003). Breast cancer survivors' attitudes about communication of breast cancer risk to their children. *American Journal of Medical Genetics (Part C: Seminars Medical Genetics)*, 119C, 45-50.
6. Kinzie, M., **Cohn, W.**, Julian, M., & Knaus, W. (2002). A best practices model for web design: Health Heritage. *Journal of the American Medical Informatics Association*, 10, 25-40.
7. Lyman, J., **Cohn, W. F.**, Knaus, W., & Einbinder, J. (2002). Introducing an academic data warehouse into the undergraduate medical curriculum. *Proceedings American Medical Informatics Association Symposium*, 474-478.
8. Miesfeldt, S., **Cohn, W. F.**, Ropka, M., & Jones, S. M. (2002). Knowledge about breast cancer risk factors and hereditary breast cancer among early-onset breast cancer survivors. *Familial Cancer*, 1(3-4), 135-141.
9. Geer, K. P., Ropka, M. E., **Cohn, W. F.**, Jones, S. M., & Miesfeldt, S. (2001). Factors influencing patients' decisions to decline cancer genetics counseling services. *Journal of Genetic Counseling*, 10, 25-40.
10. Miesfeldt, S., Jones, S. M., & **Cohn, W. F.** (2000). Informed consent for BRCA1 and BRCA2 testing: What every clinician should know about the process and content. *Journal of the American Medical Women's Association*, 55, 275-279.
11. Miesfeldt, S., **Cohn, W. F.**, Hayden, K., Turner, B., Martin-Fries, T., Clark, S., Lippert, M., & Jones, S. (1999). Men's attitudes about testing for heritable prostate cancer predisposition. *Urology*, 55, 46-50.
12. Jones, S. M., **Cohn, W. F.**, Turner, B. L., & Miesfeldt, S. (1997). Physicians need more education about inherited cancer predisposition. *Academic Medicine*, 72(10), 832-833.
13. Lloyd-McGarvey, E., Canterbury, R. J., **Cohn, W. F.**, Clavet (1996). Adolescent Inhalant Abuse and School Problems. *The School Counselor*.

C. Research Support

Ongoing Research Support

Consumer Health Education Institute Garson (Co-Director)

1/2005-6/2007

Anthem (Health Seekers)

Role: Co-Director

Aim: To develop and evaluate a segmentation approach to deliver optimal health education to consumers.

Completed Research Support

National Human Genome Research Institute Arnos (PI) 1/2004-6/2006
Sub Contract w/Gallaudet University
Evaluation of the education of audiologist about genetics
Role: Evaluator/Principal Investigator
Aim: To evaluate the educational program for audiologists in genetics.

Evaluation Contract Cohn (PI) 10/01/03-01/01/04
British Medical Journal
Evaluating a Clinical Reference Tool
Role: Evaluator/Principal Investigator
Aim: To evaluate the product by conducting a usability study for the BMJ product, Clinical Evidence Interactive.

Evaluation Contract Cohn (PI) 2/01/03-8/01/03
McGraw Hill Companies
Evaluation of a Hand Held and Wireless Point of Care Clinical Reference Tool
Role: Evaluator/ Principal Investigator
Aim: The aim of this project was to evaluate the product through conducting a pilot and usability study for the McGraw Hill Product.

Research Grant Knaus (PI) 12/01/98-11/30/01
Robert Wood Johnson Foundation
Development of a Web-Based Approach to the Collection and Interpretation of Family Health History
Role: Program Director
Aim: The aim of this project is to develop and evaluate the feasibility of a web-based family medical history information collection tool

Research Grant Miesfeldt (PI) 1/1/00-12/31/01
Arthur Vining Davis Foundation
Educating Physicians and Patients About the Benefits⁶ of Genetic Testing for Cancer
The aim of this project is to develop a web-based educational program for patients and physicians.
Role: Evaluator.

Research Grant Miesfeldt (PI) 12/01/96-11/30/00
NIH/ELSI
Attitudes About Hereditary Breast Cancer
The aim of this project is to explore and understand the factors influencing patients' decisions to undergo breast cancer genetic risk evaluation.
Role: Evaluator.

Research Grant

Keller (PI)

09/01/97-08/31/00

SAMHSA/Center for Substance Abuse Prevention

Evaluation of Contrasting Substance Abuse Plans

The aim of this project is to determine the nature and assess the effectiveness of workplace managed care programs having existing substance abuse prevention and early intervention.

Role: Evaluator.

BIOGRAPHICAL SKETCH

NAME Nina J. Solenski eRA COMMONS USER NAME	POSITION TITLE Associate Professor of Neurology – Tenure Track		
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education,</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Southern Conn. State Univ., New Haven, CT Jefferson Medical College, Philadelphia, PA Dartmouth-Mary-Hitchcock Memorial Hospital, Hanover, NH	B.S. M.D.	1977-81 1985-89 1989-90	Chemistry Medicine Medicine Internship

A. Positions and Honors:

1990-1993 Neurology Residency Training, Dept. of Neurology, University of Virginia, Charlottesville, VA

1993-1994 Cerebrovascular Fellowship, Clinical Stroke Training -Department of Neurology, University of Virginia, Charlottesville, VA; E. Clarke Haley, Jr., M.D., Preceptor

1994-1996 Cerebrovascular Fellowship, Research Training, Departments of Neurology and Neurosurgery, University of Virginia, Charlottesville, VA; Kevin S. Lee, Ph.D. and Neal F. Kassell, Preceptors

2001-Present Faculty Member - UVA Neuroscience Graduate Program

2003-Present Associate Professor of Neurology, Department of Neurology, University of Virginia, Charlottesville, VA; G. Frederick Wooten, M.D., Chairperson.

2001, 2005 American Academy Neurology and Psychiatry-dual boarded (General Neurology & Stroke)

Committee – Membership:

1996-present Society for Neuroscience

1998-present American Heart Association (AHA)-Affiliate State Representative (Liaison) Mid-Atlantic

1996-present American Heart Association (AHA)-General and Fellow Member of the Council on Stroke

currently “American Stroke Association”(ASA)

2001 -2002 Virginia Neurological Society

1997-2000 Affiliate Virginia Stroke Task Force Member, Co-Chairman Professional Education,

1997-present American Academy of Neurology (AAN): Associate Fellow-AAN Stroke & Vascular Neurology Sec.
 2004-present ASA-Stroke Volunteer Forum (invitation)
 2005-present Team Leader -American Heart Association: "Virginia Stroke Systems Plan" (20 member panel)
 2007 Virginia Joint Commission of Health Stroke Task Group – nominee (confirmation pending 05/0)

Invited Presentation/Participation (selected):

2004 University of Gotenborg, Gotenborg, Sweden. "Mitochondria Movements during Hypoxia-Reoxygenation- Implications for Neuronal Cell Death" Host: Dr. Hendrik Hagberg
 2005 Gordon Research Conference: Oxidative Stress and Disease, "Nitrosative Stress in Acute and Chronic Neurodegenerative Disorders" March 13-18th , 2005, Ventura, CA.
 2006 Maryland-Washington D.C.-Virginia - Stroke Leadership Meeting – invited Virginia Representative
 2006 Stroke Therapy Academic Industry Roundtable (STAIR)V – Faculty Member, March 2006, Chairperson – Dr. Marc Fisher.
 2007 Appalachian Summit for Cardiovascular Health (multistate event - invited Stroke Expert)
 2007 Virginia EMS Annual Mtg - invited co-lecturer (pending)

Invited Research Grant Reviewer:

1998-2001 American Heart Association (AHA), Affiliate Brain/Stroke Study Peer Review - Member
 2002 NIH-National Heart Lung and Blood Institute – Extramural Reviewer (ad hoc)
 2005-present NIH-Brain Disorders and Clinical Neuroscience IRG (BDCN) – Brain Injuries and Neurovascular Pathologies Study Section -Permanent Member
 2007-present AHA-American Stroke Association , National Brain/Stroke Grant Peer Review - Member

B. Selected (Clinical) Original Publications:

SOLENSKI N.J., Haley E.C., Kassell N.F., Kongable G., Germanson T., Truskowski L., Torner J.C. Medical complications of aneurysmal subarachnoid hemorrhage: a report of the Cooperative Aneurysm Study. *Crit Care Med* 23:1007-1017, 1995.
 SOLENSKI N.J. Thrombolytic therapy for acute ischemic stroke. *Virginia Med Quart* 2:128-130, 1998.
 SOLENSKI N.J., Adams R. Cerebrovascular disease - ischemic stroke. *Current Opinion in Critical Care* 5:102-106, 1999.
 SOLENSKI, N. J. Transient ischemic attacks: Part I. Diagnosis and evaluation. *Am Fam Physician*.;69:1665-74, 2004.
 SOLENSKI, N.J. Transient ischemic attacks: Part II. Treatment. *Am Fam Physician* 69: 1681-1688, 2004.

- SOLENSKI, N.J. Information from your family doctor. Strokes and TIAs. *Am Fam Physician* 69:1679-1680, 2004.
- SOLENSKI N.J., The neurologic complications of infectious endocarditis. In: *Neurological Infectious Diseases and Therapy*, Roos K.L., Editor. MacGraw-Hill, 2004.
- SOLENSKI N.J., Fiskum G., Rosenthal R. Ischemic brain injury In: *Foundations of Anesthesia: Basic and Clinical Sciences*. 2nd edition (textbook) Elsevier Science, 2005 [annual update].
- SOLENSKI N.J. "Novel risk factors for stroke prevention" – for *Current Drug Targets*- Invited Review – accepted 10/06 – pending publication.
- *Dumont, A., *Chang, C., Simsek, S., Titus, B., Kwan, A., Kassell, N., SOLENSKI, N.J. The adenosine 2A receptor agonist ATL-146e attenuates experimental post-hemorrhagic vasospasm. Accepted *Neurosurgery* – 12/06.
- Braithwaite, S and SOLENSKI, N.J. Analysis of EMS Stroke Systems Readiness: Virginia's Model. Submitted *Stroke* – 04/07 - review in progress.

C. Clinical Trials (selected):

- 1991 Tissue Plasminogen Activator for Acute Ischemic Stroke (rt-PA), NIH-NINDS
- 1996-97 GAIN I, GAIN II (Gavestinel, GlaxoWellcome)
- 1997 APLAUD SB214857 (SmithKline Beecham)
- 1997 LUB-USA-6 Study (Lubeluzole/t-PA, Janssen)
- 1997 PROACT II – Prolyse in Acute Cerebral Thromboembolism (Abbott)
- 1999-2000 BRAVO – Blockade of the GP IIb/IIIa Receptor to Avoid Vascular Occlusion, (SmithKline Beecham)
- 1999 WASID – Warfarin Aspirin Symptomatic Intracranial Disease, NIH-NINDS
- 2000 HALT – Hu23F2G Anti-Adhesion to Limit Cytotoxic in Stroke
- 2000-2005 Prospective Validation of a Stroke Predictive Model – ASAP, NIH-NINDS
- 2001-2002 ARTIST – AMPA Receptor Antagonist Treatment in Ischemic Stroke (YM872) Yamanouchi U.S.
- 2001-2003 AAASPS (African-American Antiplatelet Stroke Prevention Study)
- 2001-2003 Pilot Study of TNK-TPA in Acute Ischemic Stroke (TNK-S) NIH-NINDS
- *2002 SWISS - Siblings With Ischemic Stroke Study. (PI - James F. Meschia) NIH-NINDS
- *2002 ISGS - The Ischemic Stroke Genetics Study. (PI - James F. Meschia), NIH-NINDS
- 2003-2004 AbESTT-II - Abciximab (ReoPro) in Acute Ischemic Stroke: Phase III- (Centocor and Eli Lilly)
- 2003-2004 Pilot Study of TNK in Acute Ischemic Stroke (TNK-S) Phase II- NIH-NINDS
- *2004 IRIS – Insulin Resistance Intervention after Stroke Trial- NIH-NINDS
- *2005 TNK in Acute Ischemic Stroke (TNK-S) Phase IIB- NIH-NINDS
- *2005 CLEAR-IVH – Clot Lysis: Evaluating Accelerated Resolution of Intraventricular Hemorrhage: rt-PA Treatment of Brain Hemorrhage- (Genentech/FDA Orphan drug)
- *2006 Recombinant Factor VIIa in Acute Intracerebral Hemorrhagic – (NovoSeven)
- *2006-p Carotid Revascularization Endarterectomy Versus Stenting Trial (CREST) – NIH-NINDS
- *2006-p Albumin in Acute Stroke Trial (ALIAS) – site Principle Investigator (main P.I. Myron Ginsberg) – NIH-NINDS

* CURRENT

D. Completed Research Support:

Ischemia” **Title: “Free Radical Injury in Reversible Brain**

Agency: NIH-NINDS Mentored Clinical Scientist Development
Award (K08NS01857)
Period: 9/1996 -9/2001
Role: P.I.
Effort: 75%
Award*: \$493,857

Title: “Free Radical Injury in Reversible Brain Ischemia”
Agency: American Heart Association (AHA) Beginning Grants-in-
Aid (VA97GB3)
Period: 7/1997-7/1999
Role: P.I.
Effort: 75%
Award*: \$55,000

Model” **Title: “Evaluation of TAK-218 in a Rat Ischemia/Reperfusion**

Agency: Takeda Pharmaceutical Company
Period: 6/1997
Role: P.I.- in collaboration with Drs. Neal F. Kassell and
Greg A. Helms, Department of Neurological Surgery

Title: “The Role of Mitochondria in Hypoxia-Induced Neuronal Death”

Agency: American Federation of Aging Research (AFAR) (P00146)
Period: 9/2000-9/2002
Role: P.I.
Award*: \$50,000

Mitochondria” **Title: “Effect of Low Emission Laser on Neuronal**

Agency: PhotoThera Incorporated
Period: 2/01/2004-8/01/2005
Role: Co-P.I. – 25 % effort
Award: \$180,000

**Title: “Steady-State Pharmacokinetics of 30-300 Milligrams Daily
Doses of R(+) Pramipexole in Amyotrophic Lateral Sclerosis”**

Agency: Dr. James Bennett, Sponsor: Department of Neurology –
Gift Fund

Period: 01/2006- 03/2007
Role: P.I. – 20 % effort

CURRENT Research Support:

Title: “Albumin in Acute Stroke (ALIAS) Trial; Phase III”
Agency: NIH-NINDS – University of Miami – Coordinating site
Period: 01/2006-present
Role: Local -P.I. – 25 % effort
Award: \$7000/subject

Title: The Effect of Nitric Oxide on GABAergic Synaptic Transmission in the Immature Brain
Agency: Beginning-Grant-Aid – American Heart Association to
Dr. Santina Zanelli (Post-Doctoral Fellow) is PI
Role: Consultant – 10%

Karen R. Jackson
11 Church Street
Poquoson, Virginia 23662
757-869-7129 (cell)
karen@cit.org

Director, Office of Telework Promotion and Broadband Assistance
2006- Present
Commonwealth of Virginia, Richmond, Virginia

September

- Promote and encourage use of telework alternatives for public and private employees
- Support the efforts of both public and private entities within the Commonwealth to enhance or facilitate the deployment of, and access to competitively priced, advanced electronic communications services (commonly known as “broadband”) and Internet access services of general application throughout the Commonwealth.
- Specifically work towards establishing affordable, accessible broadband services to underserved areas of the Commonwealth and monitor advancements in communication that will facilitate this goal.
- Advocate for, and facilitate the development and deployment of applications, programs and services that will bolster the usage of and demand for broadband level telecommunications
- Serve as a broadband information and applications clearinghouse for the Commonwealth and a coordination point for broadband related services and programs in the Commonwealth.
- Advise the Secretary on broadband adoption, deployment and application issues.
- Coordinate activities regarding telework with, and regularly report to, a board consisting of the Secretaries of Administration, Commerce and Trade, Finance, Technology and Transportation.

Vice President, Broadband Programs

July 1999 –

September 2006

Virginia’s Center for Innovative Technology (CIT), Newport News, Virginia

Program Activities

- Represent Virginia’s Secretary of Technology in matters pertaining to broadband and rural development.
- Insure that all regions of the Commonwealth have equal access to economic development and quality of life opportunities offered by broadband telecommunications.
- Responsible for providing vision and coordination for the development of broadband telecommunications
- Serve as an independent consultant to communities embarking on broadband related initiatives.

- Develop regionally based programs targeted toward solving the “digital” needs of small and medium sized businesses and rural/underserved communities.
- Act as a catalyst for the formation of partnerships between educational institutions, industry, and the public sector to facilitate rural broadband service delivery and training.
- Perform in depth analyses at the community level and devise affordable broadband solutions based on current service availability, constituent needs, and regional economic and demographic trends.
- Act as an advocate for rural communities seeking to develop and deploy broadband solutions.
- Benchmark Virginia’s level of broadband deployment to other States and devise strategies and programs to improve the ranking.
- Oversee the delivery of e-Commerce and Broadband related outreach services across the Commonwealth to more than 50 constituents annually.

Legislative Activities

- Drafted Executive Order 35 establishing the Office of Telework Promotion and Broadband Assistance (2006)
- Drafted Legislative Language (HB1816) and provided position/impact statements on telecommunications related issues (Virginia General Assembly Session 2003).
- Researched and authored, on behalf of the Virginia’s Secretary of Technology (George Newstrom), the Final Report on “Advancing Affordable, High-bandwidth Electronic Networks in Rural Virginia” to the Governor and General Assembly of Virginia as directed by House Joint Resolution 163 (2002).
- Researched and authored, on behalf of Virginia’s First Secretary of Technology (Donald Upson), “Building a Digital Community: A Leadership Guidebook” (2001).
- Convened Virginia Governor Gilmore’s “Main Street to e-Street” and “e-Communities” Task Forces and produced Virginia Governor Gilmore’s Final Meeting of the Governor’s Commission on Information Technology.

Leadership Activities

- Served as Co-Chair, Subcommittee on Economic Development Incentives, for Virginia Attorney General Jerry Kilgore’s Task Force on Regulatory Reform and Economic Development.
- Broadband Program Coordinator, Office of the Secretary of Technology, COVITS (Commonwealth of Virginia Information Technology Symposium) 2002.
- Member, Virginia Joint Commission on Technology and Science Electronic Medical Records Advisory Committee

Regional Director 1995–1999

Virginia’s Center for Innovative Technology, Newport News, Virginia

- Worked closely with companies to identify their business and technology needs.
- Located and engaged university and private resources to assist in the development of new technologies and products.

- Assisted local technology companies in obtaining in excess of \$700,000 in grant funding.
- Maintained a client base in excess of 100 companies.
- Spearheaded effort to raise the awareness and use of Electronic Commerce in the Hampton Roads Area through the Southeastern Virginia Regional Network – a group now nurturing more than 100 companies in the use of Electronic Commerce and Internet technologies.

Associate Information Design Specialist**1994-1995****Computer Sciences Corporation, Hampton, Virginia**

- Co-authored a 2 day introductory UNIX System Administration course.
- Authored a 3 day advanced UNIX System Administration course.
- Performed UNIX/AIX system administration functions including: back up and recovery, user and queue management, scripting, and troubleshooting.
- Editor, “The Training Innovator”, the division’s quarterly publication.

Education

- **The College of William and Mary Graduate School of Business, Williamsburg, Virginia**
Master of Business Administration Degree, May 1991.
- **Christopher Newport University, Newport News, Virginia**
Bachelor of Science in Business Management, Cum Laude, May 1987.

APPENDIX C – LETTERS OF SUPPORT

RICK BOUCHER
5th District, Virginia

COMMITTEE
ENERGY AND COMMERCE

SUBCOMMITTEES
**TELECOMMUNICATIONS AND THE
INTERNET**

FOCUS: Modern,
ENERGY AND AIR QUALITY

JUDICIARY

SUBCOMMITTEES
**COURTS, THE INTERNET,
AND INTELLECTUAL PROPERTY**

CO-CHAIR,
CONGRESSIONAL INTERNET CAUCUS



Congress of the United States
House of Representatives

April 18, 2007

WASHINGTON OFFICE:
2815 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 226-5861
e-mail: R14THNET@MAIL.HOUSE.GOV
WWW: <http://www.house.gov/boucher/>

CONSTITUENT SERVICE OFFICES:
186 EAST MAIN STREET
ABINGDON, VIRGINIA 24210
(276) 626-1146

1 CLOVERLEAF SQUARE
SUITE C-1
810 STONE GAP, VIRGINIA 24159
(276) 323-0400

188 NORTH WASHINGTON AVENUE
P.O. BOX 1288
PULASKI, VIRGINIA 24601
(540) 890-4270

Karen S. Rheuban MD
Senior Associate Dean
for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
Post Office Box 800707
Charlottesville, VA 22908

Dear Dr. Rheuban:

It is my pleasure to write in support of the proposal of the University of Virginia Office of Telemedicine to the Federal Communications Commission in response to its Report and Order to encourage greater utilization of the Universal Service Fund for Rural Health Care Providers.

I understand that the funding may be used for network design, deployment of technology and to underwrite up to 85% of the costs of connectivity to enable medical facilities in rural communities to have direct and immediate access to the medical expertise and education available at any participating medical center in the Commonwealth of Virginia.

Recognizing the high stroke mortality rate in the Commonwealth, it is evident that timely access to primary stroke centers, community hospitals and health centers, EMS providers and academic medical centers will reduce deaths due to stroke, hypertension, diabetes and heart disease. I strongly support the proposal of the University of Virginia and its partners throughout the Commonwealth and urge approval of the application by the Federal Communications Commission.

With kind regards and best wishes, I remain

Sincerely,


Rick Boucher
Member of Congress

RB/bg

1ay 03 07 02:15p

Senator Edd Houck

540.891.8805

p. 1

COMMONWEALTH OF VIRGINIA

R. EDWARD HOUCK
 11th SENATORIAL DISTRICT
 ALL OF SOUTHERN LEWIS, MICHIGAN AND
 ORANGE, MICHIGAN PORT OF PROTERVINE,
 COUNTY AND DISTRICT OF PROTERVINE,
 PORT OF PROTERVINE
 11th SENATORIAL DISTRICT
 11th SENATORIAL DISTRICT
 11th SENATORIAL DISTRICT

SENATE

COMMITTEE ASSIGNMENTS:
 EDUCATION AND HEALTH
 FINANCE
 GENERAL LAWS AND TECHNOLOGY
 TRANSPORTATION
 PUBLIC

May 1, 2007

Karen S. Rheuban MD
 Medical Director of Telemedicine
 University of Virginia Health System
 Post Office Box 800707
 Charlottesville, Virginia 22908

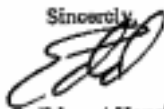
Dear Dr. Rheuban,

This is a letter of support for the University of Virginia Office of Telemedicine's proposal to the Federal Communications Commission to facilitate enhanced access to health services for citizens of rural Virginia.

As a State Senator for 24 years, I see on a recurring basis the increased difficulty to identify serious health issues and establishing way to deal with them. This is especially true in rural Virginia where medical care may be hours away. If this proposal is implemented, health care facilities in rural areas will be able to address related co-morbidities including high-blood pressure, diabetes, and obesity. Currently, these treatments are offered in larger metro areas.

It is my sincere hope that this proposal will be implemented as it will help millions of individuals in rural Virginia. Please do not hesitate to contact me with any questions or comments you may have.

Sincerely,



R. Edward Houck

REH/aww

2007

END PAGE

05/03/2007 13:51 FAX 540 891 8805

SENATE OF VIRGINIA

CHARLES R. HAYKINS
18th SENATORIAL DISTRICT
ALL OF FRANKLIN AND RYAN COUNTIES;
ALL OF THE CITY OF DANVILLE;
AND PART OF CAMPELL COUNTY
POST OFFICE BOX 818
DANVILLE, VIRGINIA 24501



COMMITTEE ASSIGNMENTS:
AGRICULTURE, CONSERVATION AND
NATURAL RESOURCES, CHAIR
FINANCE
GENERAL LAWS AND TECHNOLOGY
PROCEEDINGS AND ELECTIONS
RULES

April 27, 2007

Karen S. Rheuban, M.D.
Medical Director of Telemedicine
Senior Associate Dean for CME & External Affairs
University of Virginia Health System
Post Office Box 800707
Charlottesville, VA 22908

U. Va. Application
In Re: FCC Universal Service Fund for
Rural Health Care Providers

Dear Dr. Rheuban:

Please know my recommendation for accessing "telehealth" or "telemedicine" developments through the Universal Service Fund for Rural Health Care Providers.

In my 26 years as a Virginia legislator, many efforts have been fostered to bring appropriate medical assistances to South Central Virginia, a rural, medically under-served region with high unemployment. Currently our section is in the process of locating broadband access throughout this region with continued efforts to apply for health grants to offer increased medical services. None of our area is conveniently located to infrastructure for specialty care and ultimately implementing the clinical component for enhanced treatments would greatly increase current availabilities.

As expressed in the application, additional opportunities to address disabilities from strokes would also enhance treatments for related disorders that are leading causes of death generally recognized within our area of the Commonwealth. I must conclude disparities do exist within our region and especially the lack of immediate treatment which is underscored for surviving "heart attacks".

Please do not hesitate to let me know if I may assist your commendable efforts.

Yours truly,

A handwritten signature in dark ink, appearing to read "Charles R. Haykins".
Charles R. Haykins

COMMONWEALTH OF VIRGINIA



SENATE

April 30, 2007

PHILLIP P. PUCKETT
38th SENATORIAL DISTRICT
ALL OF ISLAND, BUCHANAN, EICHENBERG,
FISSELL, AND THORNTON COUNTIES AND
11 OF PLUMMER, SMITH, WISE, AND WYTHE COUNTIES
HOME OFFICE: 874 8440
LENOXSVILLE: VIRGINIA 2428
4001 EMBURY ROAD
17th STREET, THORNTON
1001 BOWEN ROAD, LENOXSVILLE
404 883 5138 HOME

COMMITTEE ASSIGNMENTS:
AGRICULTURE, CONSERVATION AND
NATURAL RESOURCES
LOCAL GOVERNMENT
PRIVILEGES AND ELECTIONS
TRANSPORTATION

Karen S. Rheuban, MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
P.O. Box 800707
Charlottesville, VA 22908

Dear Dr. Rheuban:

I am writing to express my full support for the University of Virginia Office of Telemedicine's proposal to the Federal Communications Commission to facilitate enhanced access to healthcare services for citizens of rural Virginia. I am quite excited about this project and the positive impact it will have on citizens in rural areas of the Commonwealth, like the 38th Senate District, which I am privileged to represent in the Virginia General Assembly.

It is quite encouraging that this proposal is designed to offer greater access to education and prevention programs, and specialty care where not locally available. The plan to connect healthcare centers and healthcare providers in order for patients in rural areas to have access to telehealth services will add great value to rural Virginia. The exchange of medical information within healthcare systems and across systems is an important goal to allow more affordable, more easily accessible healthcare services to rural citizens across the Commonwealth.

Again, it is with great pleasure that I express my full support for the University of Virginia Office of Telemedicine's proposal to the Federal Communications Commission to facilitate enhanced access to healthcare services for citizens of rural Virginia. Thank you for your efforts to improve access to healthcare services for citizens in Southwest Virginia and throughout rural Virginia. Please feel free to contact my office or me if we can ever be of further assistance to you with this important project.

Sincerely,

Phillip P. Puckett
Member, Senate of Virginia

002/002/002

UVA CME
SENATOR PHILLIP PUCKETT

04/30/2007 15:34 FAX 404 982 1415
04/30/07 MON 15:00 FAX 216 9789363



HARVEY B. MORGAN
POST OFFICE BOX 949
GLOUCESTER, VIRGINIA 23061
NINETY-EIGHTH DISTRICT

COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

COMMITTEE ASSIGNMENTS:
COMMERCE AND LABOR (CHAIRMAN)
APPROPRIATIONS
AGRICULTURE, CHESAPEAKE AND
NATURAL RESOURCES

April 26, 2007

Karen S. Rheuban MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
PO Box 800707
Charlottesville, VA 22908

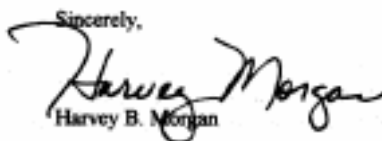
Dear Dr. Rheuban:

I write in support of the University of Virginia (UVA) Office of Telemedicine's proposal to the Federal Communications Commission (FCC) to facilitate enhanced access to healthcare services for citizens of rural Virginia.

Identifying, diagnosing, and treating serious health issues and establishing ways to deal with them is a major challenge in rural areas. The Commonwealth's plan to target poor recognition of patient symptoms, delayed Emergency Medical Service (EMS) notification and delayed patient intervention in rural, geographically challenged regions will significantly enhance the availability and quality of care in my district. Geographic barriers and the need for parity with urban communities play significant roles in planning as local and state leaders work together to address needs and promote partnerships to meet those needs. This proposal offers an approach that traverses physical boundaries while offering facilities in my district the opportunity to provide enhanced healthcare services through partnerships with cutting-edge research and treatment facilities such as the University of Virginia.

I am pleased that UVA has reached out to facilities in my district to participate in this proposal, and I encourage the FCC to provide the funding needed to turn this dream into a reality.

Sincerely,


Harvey B. Morgan



ROBERT J. WITTMAN
POST OFFICE BOX 995
MONTROSE, VIRGINIA 22820
NINETY-NINTH DISTRICT

COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

COMMITTEE ASSIGNMENTS:
TRANSPORTATION
AGRICULTURE, CHESAPEAKE AND
NATURAL RESOURCES
MILITIA, POLICE AND PUBLIC SAFETY

May 3, 2007

Karen S. Rheuban MD
Professor of Pediatrics
Medical Director, Office of Telemedicine
PO Box 800711
UVA Health System
Charlottesville, VA 22908

Dear Dr. Rheuban,

I am writing today in support of the application submitted by the University of Virginia's Office of Telemedicine for pilot grant funding for the Rural Healthcare Support Mechanism. As a member of the Virginia House of Delegates I support efforts to enhance the deployment of broadband in the service of healthcare for our citizens.

As you may already be aware, much of the area that I represent has been declared medically underserved. The expansion in the use of broadband to transmit medical information has the ability to greatly increase the quality of medical care given to my constituents. With this technology there is better connectivity amongst our state's healthcare professionals, patients, hospitals and clinics. This is especially important when working patients that have existing medical conditions, such as a stroke.

Knowing that UVA offers clinical services through its telemedicine program in more than thirty specialties and subspecialties makes them an ideal candidate for this funding and a true asset to our constituents. By adding the proposed stroke intervention, prevention and education network to what is already covered in the Virginia Telehealth Network will make Virginia a leader in Telehealth care. With warm wishes and kind regards, I remain

Sincerely,

Robert J. Wittman,
Virginia House of Delegates

05/02/2007 23:41 7577872749

POULSON NORTHAM LEWIS

PAGE 02/03



COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

LYNNWOOD W. LEWIS, JR.
23301 FRONT STREET
POST OFFICE BOX 700
ADGOMAC, VIRGINIA 23001
ONE HUNDREDTH DISTRICT

COMMITTEE ASSIGNMENTS:
FINANCE
AGRICULTURE, CHESAPEAKE AND
NATURAL RESOURCES
MILITIA, POLICE AND PUBLIC SAFETY

May 3, 2007

Karen S. Rheuban, MD
Professor of Pediatrics
Medical Director, Office of Telemedicine
P.O. Box 800711
UVA Health System
Charlottesville, Virginia 22908

Dear Dr. Rheuban:

I am writing to support the application of the University of Virginia Office of Telemedicine for pilot grant funding for the Rural Healthcare Support Mechanism.

I serve on the House Finance Committee. My district is largely rural. Funding the deployment of broadband is one of my top priorities, and you have my fullest support in your efforts to enhance the deployment of broadband in the service of healthcare for our Virginia citizens.

The proposal you offer makes access to education and prevention programs a priority. This is also a priority for the citizens of Virginia's Eastern Shore. We envision opportunities for employees to access health education at the workplace, as well as home, if this proposal is successful. In addition, the component of the proposal, which provides access to specialty care, is vital to our citizens as well. The medical leadership on the Eastern Shore has an outstanding working relationship with their counterparts in the rural parts of Southwest and Southside Virginia. This network will greatly enhance this exchange of ideas and information. Finally, with potential influenza epidemics, having the ability to share information and access data will be critical to containing the spread of the flu or other virus.

Since its inception in 1985, the University of Virginia has made great strides to bring specialty care services to our rural citizens; our goal is to further advance the connectivity amongst our states healthcare professionals, patients, hospitals and clinics. An expansion of the broadband footprint in regions of Virginia with limited connectivity and in parallel, increasing access to clinical and health related educational services across that infrastructure is crucial to these efforts.

DISTRICT: (757) 767-1084 • RICHMOND: (804) 696-1000 • E-MAIL: LLEWIS@HOUSE.STATE.VA.US

05/02/2007 23:41 7577872749

POULSON NORTHAM LEWI

PAGE 03/03

Karen S. Rheuban, MD
May 3, 2007
Page 2

Knowing that UVA offers clinical services through its telemedicine program in more than thirty specialties and subspecialties is of great importance to our constituents. Adding this proposed stroke intervention, prevention and education network to the armamentarium of the Commonwealth's academic health centers and community hospitals through the Virginia Telehealth Network will propel us towards attainment of our health-related goals.

Sincerely,


Lynwood W. Lewis, Jr.
100th District



Marilyn B. Tavenner
Secretary of Health and Human Resources

Anesh P. Chopra
Secretary of Technology

May 2, 2007

Karen S. Rheuban MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
P. O. Box 800707
Charlottesville VA 22908

Dear Dr. Rheuban:

We want to thank you for all that you and the UVA Office of Telemedicine have done to advance telehealth in Virginia. We very much appreciate your excitement, enthusiasm and willingness to partner with the Commonwealth in response to the Rural Health Care Pilot Program. As you know, Virginia has taken a bold and ambitious approach to advancing technology development. We also desire to be bold in our approach to using technology to advance access to quality health care for all Virginians.

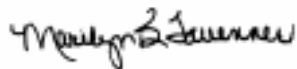
As you well know, the Virginia Department of Health has been instrumental in bringing together stakeholders to assess the present telehealth infrastructure and capacity in Virginia and to think strategically about how to improve the same. This has resulted in a strategic plan for telehealth in the Commonwealth that calls for a statewide integrated telehealth network, the Virginia Telehealth Network (VTN).

We see the Rural Health Care Pilot Program as a perfect opportunity to further solidify the partnership between Technology and Health and to jumpstart the Virginia Telehealth Network. Should Virginia be selected to receive funds through the Rural Health Care Pilot Program, this Administration would support the inclusion of state funds in the 2008 – 2010 biennial budget for administration, marketing, and program evaluation of the Virginia Telehealth Network and its activities.

*Karen S. Rheuban MD
May 2, 2007
Page 2 of 2*

The telestroke initiative, as described in your Rural Health Care Pilot Program proposal, is a great starting point to a much broader telehealth vision that includes telehealth education, electronic medical records, clinical telemedicine, emergency medical services, and more. Again, we thank you for all your work and willingness to support this partnership.

Sincerely,



Marilyn B. Tavenner
Secretary of Health & Human Resources



Aneesh P. Chopra
Secretary of Technology

MBT/aac

**COMMONWEALTH of VIRGINIA**

ROBERT B. STROUBE, MD., M.P.H.
STATE HEALTH COMMISSIONER

Department of Health
P.O. BOX 2448
RICHMOND, VA 23218

TTY 7-5-1 OR
1-800-828-1120

May 1, 2007

Karen S. Rheuban, MD
Senior Associate Dean for CME and External Affairs
Medical Director, Office of Telemedicine
University of Virginia Health System
P.O. Box 800707
Charlottesville, VA 22908

I want to take this opportunity to say what a pleasure it has been to work with you over the past four years as we've laid the foundation for the Virginia Telehealth Network (VTN). As you well know, the VDH Office of Health Policy and Planning has as its mission "to improve access to quality health care for all Virginia residents". Our office functions as our State Office of Rural Health, State Primary Care Office, and State Office of Minority Health. Consequently we partner closely with our VDH colleagues in the Office of Emergency Medical Services, the Emergency Preparedness and Response Program, the Office of Epidemiology Division of Disease Prevention, and the Office of Family Health Services Division of Chronic Disease Prevention and Control. Every one of these Offices has a vested interest in the advancement of telehealth in Virginia.

I can't even begin to express how excited we are about this FCC Rural Health Care Pilot Program opportunity and the potential it has as a catalyst for making the VTN vision a reality. You and all your colleagues at the University of Virginia Office of Telemedicine have been invaluable members of the VTN, consistent partners in delivering services to medically underserved areas, and have gone above and beyond as contributors to the improvement of the current telehealth infrastructure and utilization in the Commonwealth. I look forward to many more years working with all of you to improve access to quality health care for all Virginia residents!

Sincerely,

A handwritten signature in cursive script that reads "Kathy H. Wiberly, Ph.D.".

Kathy H. Wiberly, Ph.D.
Acting Office Director
Virginia Department of Health
Office of Health Policy and Planning





CIT BROADBAND

CENTER FOR INNOVATIVE TECHNOLOGY

May 3, 2007

Karen S. Rheuban MD
Professor of Pediatrics
Medical Director, Office of Telemedicine
PO Box 800711
UVA Health System
Charlottesville, VA 22908

Dear Dr. Rheuban,

I am writing to support the application of the University of Virginia Office of Telemedicine for pilot grant funding for the Rural Healthcare Support Mechanism.

As Vice President of Broadband Programs for the Center for Innovative Technology and the Director of the Commonwealth's Office of Telework Promotion and Broadband Assistance, I whole-heartedly endorse this application and pledge my full commitment to making the VAST network a successful and sustainable endeavor.

The VAST program is in direct alignment with the broadband deployment work being done by my office and healthcare initiatives being carried out across the Commonwealth. Uniquely positioned, VAST has the potential to deliver the double benefit of enhancing the Commonwealth's broadband footprint while simultaneously expanding quality healthcare services to a greater proportion of Virginia's citizens.

CIT is a long-time supporter of the UVA telemedicine program and I pleased to be able to offer my support for your latest endeavor. I applaud the foresight and planning that has gone into design of the VAST network. The clinical and technical aspects of proposed by VAST demonstrate that it is indeed possible to meet the needs of the citizenry through partnerships and the leveraging of assets. Your team has configured a technologically forward thinking "hybrid" approach that embraces emerging technologies, while remaining open enough in its architecture to accommodate numerous connectivity, maintenance, and service configurations. I believe that this configuration coupled with your top-notch team positions VAST to be a successful and sustainable endeavor.

Sincerely,

2214 Rock Hill Road
Suite 600
Herndon, VA 20170-4225
T | 703 689 3000
F | 703 689 3041
W | www.cit.org


Karen R. Jackson

**COMMONWEALTH of VIRGINIA*****Department of Medical Assistance Services***

PATRICK W. FINNERTY
DIRECTOR

May 1, 2007

SUITE 1300
800 EAST BROAD STREET
RICHMOND, VA 23219
804/786-7933
800/343-0634 (TDD)

Karen S. Rheuban, MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
P. O. Box 800707
Charlottesville VA 22908

Dear Dr. Rheuban:

The Virginia Department of Medical Assistance Services (DMAS) welcomes the opportunity for the further expansion of telehealth services through this proposed statewide stroke initiative.

The grant funds available from the Federal Communications Commission allow the Commonwealth to expand and strengthen the telehealth infrastructure for the delivery of healthcare services. Those persons suffering from stroke and its co-morbidities, such as heart disease, will benefit from this infrastructure through greater access to education and prevention programs as well as specialty care for diagnosis and treatment. DMAS is aware that in the proposed statewide stroke initiative, there are applications that utilize store and forward technology. DMAS is interested in exploring these and other opportunities that could lead to better health outcomes, while enhancing the sustainability of telehealth service providers.

DMAS has covered select telehealth services since 1995. This coverage was initially a pilot project and then expanded statewide in 2003. DMAS has worked closely with you and the University of Virginia Office of Telemedicine and participated actively in the strategic planning process for the development of the Virginia Telehealth Network. DMAS looks forward, under the grant, to continuing this partnership to shape the telehealth infrastructure for optimally meeting the needs of stroke patients in Virginia.

Sincerely,

A handwritten signature in dark ink, appearing to read "PW Finnerty".

Patrick W. Finnerty

PWF/jn



**JOHNSTON MEMORIAL
HOSPITAL**

April 23, 2007

Karen S. Rheuban, MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
PO Box 800707
Charlottesville, Virginia 22908

Dr. Rheuban,

I am writing to offer my support for the University of Virginia Office of Telemedicine's proposal to the Federal Communications Commission in response to its recent Report and Order to encourage greater utilization of the Universal Service Fund for Rural Health Care Providers.

Johnston Memorial Hospital is proud to be a partner in this endeavor. Being located in a rural area, we know first hand that greater access to education and prevention programs, as well as specialty care where not locally available, is imperative. Through the use of acute stroke diagnosis and therapy (including the judicious administration of thrombolytic agents) and by connecting the Commonwealth's primary stroke centers, academic medical centers, community hospitals, and community health centers we will be able to offer citizens in our service area diagnostic and treatment options currently reserved for those in metropolitan markets.

In addition, we are pleased to have the opportunity to partner with the University of Virginia and the Commonwealth to create an environment and infrastructure through which the exchange of medical information within health care systems and across systems in regional health information organizations will be facilitated.

Again, thank you for the opportunity to participate in this proposal. We look forward to a favorable decision from the FCC and to collaborating in the future.

Sincerely,

Sean McMurray
CEO

THE TECHNOLOGY TO HEAL - THE COMPASSION TO CARE

351 Court Street NE Abingdon, Virginia 24210 phone 276-676-7000 fax 276-676-2631

**CLINCH RIVER HEALTH SERVICES, INC.**

GARY E. MICHAEL, M.D.
TODD A. CASSEL, M.D.
SABRINA MITCHELL, F.N.P.
CAROLYN G. BOWEN, EXECUTIVE DIRECTOR

ROUTE 1, BOX 20
DUNBAR, VA 24245
TELEPHONE: (276) 467-2201
FAX: (276) 467-2673

April 20, 2007

Karen S. Rheuban, MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
P O Box 800707
Charlottesville, VA 22908

Dear Dr. Rheuban:

Clinch River Health Services is very eager to support the worthwhile effort by the University of Virginia to submit a proposal to the Federal Communications Commission. With almost thirty years of rural health service, Clinch River Health Services has seen the early years of limited medical technology with limited medical access, and then the later years of advanced medical technology, but with the continued limited medical access. Previous efforts by UVA have allowed Clinch River Health Services to tap some of the resources at UVA via Telemedicine referral. The new endeavor of starting the Telepsychiatry partnership between Clinch River Health Services and UVA hopefully will fill the deep void of advanced Mental Health Care lacking in rural areas. Our community, Civic groups, and local leaders have been very impressed by and responsive to these efforts.

However, there is so much more to be achieved in raising the level of care in our rural areas. Some examples are providing an educational link, an emergency alert system, and an information conduit for the rural providers, who are the backbone of our rural health system. Coordination of efforts to reduce disparities, target disease entities with high morbidity and mortality, identify and connect our rural patients to educational and ancillary services such as nutrition, risk behavior modification, retinopathy screening. Every effort to expand and heighten telecommunications with rural areas brings us closer to developing a healthier, stronger, and more progressive community.

Sincerely,

Carolyn Bowen

Carolyn Bowen
Executive Director, CRHS

Gary E. Michael, MD

Gary E. Michael, MD
Medical Director, CRHS



May 2, 2007

Karen S. Rheuban, MD
University of Virginia
Department of Pediatrics
PO Box 800311
McKim Hall, RM G151A
Charlottesville, Va 22904

Dear Dr. Rheuban:

I am writing to express my enthusiastic support for The Office of Telemedicine of the University of Virginia Health System's proposal to the Federal Communications Commission. This proposal promises to facilitate enhanced access to healthcare services in the Commonwealth by expanding the existing broadband infrastructure in Virginia and in particular, by building and deploying an MPLS network (Multi Protocol Label Switching).

The goals of the proposal align well with UVa's mission and should serve the Commonwealth well. We are honored to partner with two of the Commonwealth's universities (Virginia Polytechnic Institute and State University, and Virginia Commonwealth University) as well as the relevant and key state agencies addressing healthcare and information technology to bring this project to fruition.

You have my support for this initiative.

Sincerely,

A handwritten signature in cursive script, appearing to read "James L. Hilton".

James L. Hilton
Vice President and Chief Information Officer



Office of the Chief Information Officer

May 2, 2007

Dr. Karen Rheuban
University of Virginia Health System
Office of Telemedicine

Dear Dr. Rheuban:

As a member of the senior leadership of the University of Virginia Medical Center, I offer our focus and support for the proposal you are submitting in response to the FCC Pilot for the Rural Healthcare Support Mechanism. The University of Virginia Health System's Office of Telemedicine, under your medical directorship, already has a successful track record of serving rural health initiatives in Virginia that has been recognized by the Commonwealth of Virginia's Secretaries of Technology and of Health and Human Services. Your accomplishments in delivering care via the efficient use of technology (telemedicine) to our rural citizens of Virginia substantiates the likelihood of success that can be achieved with the plan set forth in your proposal.

This plan for reducing the morbidity and mortality of stroke in Virginia relies on the FCC award that will allow for utilization of an enhanced connectivity via the Multi Protocol Label Switching network in the most underserved regions where limited bandwidth has been deployed. The partnerships have been established that are necessary to succeed inclusive of Virginia Department of Health, the Virginia Telehealth Network, Virginia Polytechnic and State University, Virginia Commonwealth University, the Tobacco Commission and the Virginia Department of Housing and Community. The plan your proposal sets forth, with the full support of the Commonwealth, to ultimately transition all the Commonwealth's health providers to this network enabling delivery of clinical services, educational offerings and facilitation of future interoperable health information exchanges gives the perfect nexus of technology and direct care.

Sincerely,

A handwritten signature in cursive script that reads "Barbara Baldwin".

Barbara Baldwin
Chief Information Officer
University of Virginia Health System

APR-30-2007 11:22

Medical Staff Services

4347993822 P.02



Danville Regional

MEDICAL CENTER

April 29, 2007

Karen S. Rheuban, MD
Professor of Pediatrics, Senior Associate Dean for CME
Medical Director, Office of Telemedicine
PO Box 800711
UVA Health System
Charlottesville, VA 22908

Dear Dr. Rheuban,

I am writing to support the application of the University of Virginia Office of Telemedicine for pilot grant funding for the Rural Healthcare Support Mechanism. The Danville Regional Medical Center supports your efforts to enhance the deployment of broadband in the service of healthcare for Virginia citizens. Our medical center has long played a significant role in ameliorating the significant co-morbidities of stroke, hypertension, diabetes and obesity, and we welcome the opportunities that deeply discounted broadband services can contribute to further advance that effort.

In the Commonwealth, we have made great strides to bring specialty care services to our rural and urban citizens but there is so much more we can do. An expansion of the broadband footprint in regions of Virginia with limited connectivity and in parallel, increasing access to clinical and health related educational services across that infrastructure is crucial to these efforts.

Adding this proposed stroke intervention, prevention and education network in a partnership between Virginia's academic health centers and community hospitals will propel us towards attainment of our health related goals. The Danville Regional Medical Center supports this initiative.

Sincerely,

Michael A. Moore, MD, FACP, FAHA
Chief Medical Officer

142 South Main Street • Danville Virginia 24541

TOTAL P.02

05/01/07 TUE 15:28 FAX 4349474912

CENTRA HEALTH HIS

002

Centra Health

1920 Asherholt Road
Lynchburg, VA 24501-1104
(834) 947-4700

May 1, 2007

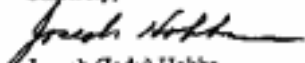
Karen S. Rheuban MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
PO Box 800707
Charlottesville, VA 22908

Dear Karen:

My name is Jody Hobbs and I am the Enterprise Architect for Centra Health. I am contacting you regarding the FCC Pilot Proposal. We (Centra Health) are very much interested in participating in the pilot. The funding for this pilot falls in line with Centra Health's current strategic initiatives. We work with nTelco our local Telco and the Mid-Atlantic Broadband Commission (MBC) to provide high-speed bandwidth to our remote/rural facilities connecting to our HIS systems, Cardiology and Radiology PACS systems.

Please let me know how we should proceed to become a participating member of the pilot. I can be reached by email at jody.hobbs@centrahealth.com or phone 434-947-4836. Thank you for considering Centra Health.

Sincerely,


Joseph (Jody) Hobbs

VCU

V i r g i n i a C o m m o n w e a l t h U n i v e r s i t y

Medical Center

In the tradition of the Medical College of Virginia

MCV Campus**Department of Surgery**
Medical Informatics
and Technology Applications
ConsortiumSanger Hall, Room 6-015
1101 East Marshall Street
P.O. Box 980480
Richmond, Virginia 23298-0480804-827-1020
Fax: 804-827-1029
www.mediac.com

May 3, 2007

To Whom It May Concern:

It is my pleasure to participate in the development and application of this proposal to the FCC. As a Chief Scientific Officer at Department of Surgery, Virginia Commonwealth University, my research is dedicated to telemedicine and medical informatics. I'm excited by Virginia Telehealth Network's approach to expand hardware and software capabilities to the field of telemedicine for rural health care. Enhancements to communication portals, a natural output of this research, will be of benefit to both rural patients and clinicians.

My efforts to advance telemedicine include disaster relief use of telemedicine, use of Internet for intraoperative consultation and early work on teleanesthesia. As an editor of the International Journal of Telemedicine and Applications, I know firsthand the improvements and limitations of the state of the art of rural health care. The requirement for high bandwidth presents one of the crucial barriers to fielding telemedicine systems for management of chronic diseases such as stroke. The need for streaming video, audio, and diagnostic image data such as CT scans is required for optimal teleconsultation. But bandwidth must be effective for teleconsult systems to be effective. These compelling needs present a challenge worthy of intense research.

I have great interest in application of monitoring a persons and motor skills in their home, reliably, and cost-effectively such that there is an improvement in the ability of the medical community to support the health of the aging population. I will participate to the stated commitment in the grant as a Co-Investigator. Thus lend my expertise in arenas of device development for remote patient monitoring and communication network architecture management relative to informatics as deemed necessary to bring this project to success. Those of us who have worked in telemedicine arenas over the years know the tremendous asset there is for such technologies to more efficiently manage patients from outside the immediate bounds of healthcare facilities.

Sincerely,



Azhar Rafiq, MD MBA

Associate Professor

Department of Surgery



THE MEDICAL SOCIETY OF VIRGINIA

Representing Virginia Physicians and Patients Since 1820

April 23, 2007

Karen S. Rheuban MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
PO Box 800707
Charlottesville, VA 22908

Dear Dr. Rheuban:

The Medical Society of Virginia would like to express its support for The University of Virginia Office of Telemedicine's proposal to the Federal Communications Commission (FCC) for pilot funds from the Universal Service Fund for Rural Health Care Providers. These funds will help to deploy a greater broadband infrastructure to improve the health of the patients we serve.

We are pleased to learn that as a result of this effort, we can expect:

1. Increased access to stroke prevention and treatment programs.
2. Increased access to diabetes care and prevention and treatment of hypertension.
3. Increased deployment of broadband in rural communities to foster collaborative care
4. Improved connectivity for EMRs and health information exchange across the spectrum of health care providers and services.

The healthcare needs of rural Virginians are well documented, and that funds are awarded so that rural communities are provided direct and immediate access to the medical expertise and education. We applaud the physicians and staff who are devoting their skills and time to this very important program. MSV would like to express its endorsement to secure these funds for their efforts.

Sincerely,

Craig L. Hensle, MD
President



Karen S. Rheuban M.D.
Senior Associate Dean for CME and External Affairs
Medical Director, Office of Telemedicine
University of Virginia
Charlottesville, VIRGINIA 22908

April 30, 2007

Dear Dr. Rheuban,

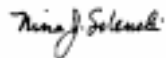
It is with great enthusiasm that on behalf of the Virginia Stroke Systems of Care (Va SSC) team, we write today in support of the proposal entitled "Virginia Acute Stroke Telehealth (VAST)" being considered for funding through the Federal Communication Commission's Rural Health Pilot Program.

As you know, the Virginia Stroke Systems of Care Task Force was initiated through the efforts of the American Stroke Association [Mid-Atlantic division] in partnership with the Virginia Department of Health Heart Disease and Stroke Prevention Project. Over the course of a year, this group of 20 stroke experts developed an insightful comprehensive statewide workplan to address disparities in the current system of stroke care. This plan emphasizes the unique regional needs particular to the southwest, central and the eastern shore regions. The plan includes advancing telehealth services to these underserved regions within each component of stroke care. In particular, telehealth services would be vital to ensure that the rural underserved regions of Virginia receive *the same quality and access to care* as the other regions in the state.

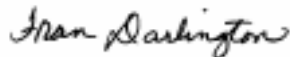
The current proposal is unique from the standpoint that it reaches nearly every component of the stroke continuum of care. This *integrated approach ensures that each part of the health care system can advance smoothly and efficiently*. Educating health care staff and

patients about the risks, and signs and symptoms of stroke is only valuable if the system can provide the next step, which is timely, quality care. From this standpoint the present proposal affords great benefit to the citizens of Virginia.

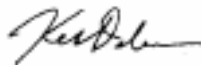
We highly endorse this proposal and look forward to continuing to work with you to accomplish this important project.



Nina J. Solenski, M. D.
Team Leader, Virginia Stroke Systems of Care



Fran Darlington
Virginia Department of Health
Manager, Heart Disease and Stroke Prevention Project



Keltie Delamar
State Health Alliances Director, American Heart Association/American Stroke Association

Enclosures: List of Virginia Stroke Systems of Care representatives

Many key alliances and partners provided representation for the Virginia Stroke Systems of Care team including:

Bon Secours Richmond Health System & Stroke Systems Consulting	Stroke Survivor
Carilion New River Valley Medical Center Department of Physical Medicine & Rehabilitation	University of Virginia, Radiology Department
Centra Health, Inc., Lynchburg General Hospital	University of Virginia Health System, Dept of Adult Acute Care & Neuroscience Programs
Central Virginia Emergency Associates	University of Virginia Stroke Center, Department of Neurology
Central Virginia Health Services, Inc.	Virginia Commonwealth University School of Medicine, Department of Family Medicine Practice: Practice-based Research Network (ACORN)
CJW, Johnston-Willis Campus (HCA)	Virginia Department of Health, Office of Emergency Medical Services
Commonwealth Neuro Specialists, PC	Virginia Department of Health, Heart Disease and Stroke Prevention Project
INOVA Health System, Department of Community Health	Virginia Hospital and Healthcare Association
INOVA Rehabilitation Center, Mount Vernon Hospital	Virginia Organization of Health Care Social Workers (VOHCSW)
Montgomery Regional Hospital	Virginia Primary Care Association
Virginia Department of Health, Office of Emergency Medical Services Medical Direction Committee	Virginia Rural Health Association

84/38/2007 22:39

7574140416

ESR4 BILLING

PAGE 82/83



Quality Family Medicine

Corporate Office
 9434 Hospital Avenue
 Post Office Box 1039
 Newsome, VA 23113
 757-414-0400
 Fax 757-414-0569
www.vpcanet.org
 E-mail: info@vpcanet.org

Atlantic Community**Health Center**

8034 Landford Highway
 Post Office Box 139
 Oak Hill, VA 23116
 757-824-5676
 Fax 757-824-5872

Bayview Community**Health Center**

22214 South Bayville Rd.
 Post Office Box 970
 Chertow, VA 23016
 757-831-1086
 Fax 757-831-1129

Chincoteague Island**Community Health Center**

4045 Main Street
 Chincoteague Island, VA 23336
 757-336-3637
 Fax 757-336-3703

Franktown Community**Health Center**

9139 Franktown Rd.
 Post Office Box 9
 Franktown, VA 23554
 757-442-4879
 Fax 757-442-9505

Oxley Community**Health Center**

20280 Market Street
 Oceanock, VA 23417
 757-787-7374
 Fax 757-787-4513

DENTAL CENTERS**Bayview Community****Health Center**

757-831-1086

Franktown Community**Health Center**

757-442-4819

Pungoteague Elementary**School Dental**

757-789-7777

Metropolitan Elementary**School Dental**

757-685-1139

May 1, 2007

Karen S. Rheuban MD

Senior Associate Dean for CME and External Affairs

Medical Director of Telemedicine

University of Virginia Health System

PO Box 800707

Charlottesville, VA 22908

By Fax: 434-982-3635

Dear Dr. Rheuban:

I am writing in support of your application for FCC funding for infrastructure to establish a telehealth network directed to improving prevention and treatment of stroke and its contributing conditions, including hypertension, diabetes and cardiovascular disease.

Our practice, a Federally Qualified Community Health Center (FQHC), serves approximately 24000 patients, or 42% of the total population of the Eastern Shore of Virginia, comprising Accomack and Northampton Counties. We serve as the safety net provider for the uninsured and underinsured populations in this rural area, and the provider of ambulatory primary and preventive care to a substantial number of migrant agricultural workers, as well as the primary care provider of choice to a significant number of the insured patients in the area.

Through our performance improvement and community needs assessment activities, we have recognized that, despite the hard work and good intentions of our physicians and midlevel providers, treatment of the precursors of stroke in our community is not achieving optimal goals. Furthermore, once stroke happens, in this isolated rural community with limited neurological and radiology consulting resources, treatment may not be sufficiently timely to limit neurological damage.

Access to neurological consulting, image exchange and radiology consultation through telehealth will be immensely helpful in dealing with established strokes. However, the major benefit to primary and preventive care will accrue through the network's support of health information technology networks, both for timely exchange of individual patient information among providers, as well as data aggregation for performance improvement purposes. As such, this program will dovetail extremely well with plans underway by the Virginia Primary Care Association and the Community Care Network of Virginia to develop an integrated system of electronic health records among the 22 Community Health Center Members



04/30/2007 22:39

7574148416

ESBH BILLING

PAGE 83/83



Quality Family Healthcare

Corporate Office

9434 Hospital Avenue

Post Office Box 1039

Newman, VA 23413

757-424-0400

Fax 757-424-0369

www.vast.org

E-mail: vast@vast.org

Atlantic Community**Health Center**

8034 Lankford Highway

Post Office Box 130

Oak Hall, VA 22414

757-824-5876

Fax 757-824-5872

Bayview Community**Health Center**

22214 South Bayview Rd.

Post Office Box 970

Cheriton, VA 22516

757-331-1086

Fax 757-331-1129

Chesapeake Island**Community Health Center**

4049 Main Street

Chesapeake Island, VA 23336

757-336-3682

Fax 757-336-3703

Franktown Community**Health Center**

9159 Franktown Rd.

Post Office Box 9

Franktown, VA 23354

757-442-4819

Fax 757-442-9905

Onley Community**Health Center**

20280 Market Street

Onley, VA 23417

757-787-7374

Fax 757-787-4513

DENTAL CENTERS**Bayview Community****Health Center**

757-331-1086

Franktown Community**Health Center**

757-442-4819

Pungitnappe Elementary**School Dental**

757-789-7777

Monmouth Elementary**School Dental**

757-789-7777

across the Commonwealth. This system will feed into a central data center, whose purpose is to support implementation of evidence based clinical guidelines among the members, and hopefully, to extend them to the private practices in our communities. Access to the proposed high speed data network will greatly facilitate implementation of this system.

Thank you for the opportunity to comment on this RFP, which I support most enthusiastically.

Sincerely,

Parker C. Dooley, MD
Medical Director





4200 IMMSLAKE DRIVE, SUITE 203, GLEN ALLEN, VIRGINIA 23060-8712
P.O. BOX 31394, RICHMOND, VIRGINIA 23294-1394
(804) 965-1227 FAX (804) 965-9475

April 23, 2007

Karen S. Rheuban, M.D.
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
PO Box 800707
Charlottesville, VA 22908-0707

Dear Dr. Rheuban:

We are writing to express our support for a University of Virginia Office of Telemedicine proposal to the Federal Communications Commission (FCC) that promises to facilitate enhanced access to healthcare services, especially for rural Virginians. The proposal responds to the FCC's recent Report and Order to encourage greater utilization of the Universal Service Fund for Rural Health Care Providers.

This two-year pilot program will help medical facilities in rural communities gain access to high speed voice, video and data connectivity, enabling rural communities to have direct and immediate access to the medical expertise and education available within any of the Commonwealth's participating medical centers.

The past successes of the University of Virginia Office of Telemedicine in developing, coordinating and implementing successful telehealth/telemedicine demonstrates its qualifications to carry out the activities that will be funded by this award.

When coupled with funds that you are seeking from other sources to support the implementation of the clinical component of the proposal, this proposal will allow the Commonwealth to expand and strengthen the infrastructure across which healthcare services are provided.

We also support your decision to focus the project on the reduction in the disparities related to stroke and its co-morbidities of hypertension, diabetes and heart disease; this goal is very much aligned with the needs of the Commonwealth as articulated by health status indicators and the Healthy Virginians Initiative. Virginians will benefit from the steps taken to reach this goal, including greater access to education and prevention programs and specialty care where it is not locally available and improved acute stroke diagnosis and therapy achieved by connecting the Commonwealth's primary stroke centers, academic medical centers, community hospitals and community health centers. This project also can create an environment and infrastructure through which the exchange of medical information within health care systems and across systems in regional health information organizations will be facilitated.



Karen S. Rheuban, M.D.

April 23, 2007

Page 2

We thank you for this opportunity to express our support for your proposal and offer our assistance in this project.

Sincerely,



Laurens Sartoris
President



April 30, 2007

Karen S. Rheuban MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
PO Box 800707
Charlottesville, VA 22908

RE: FCC Rural Healthcare Pilot Program

Dear Dr. Rheuban,

On behalf of Community Care Network of Virginia (CCNV), I am pleased to write this letter in support of the University of Virginia's application to the Federal Communications Commission in response to its recent Report and Order to encourage greater utilization of the Universal Service Fund for Rural Health Care Providers.

Community Care Network of Virginia is the statewide network owned and governed by all 23 of Virginia's Federally Qualified Health Centers operating in more than 70 office locations throughout the Commonwealth. It is my understanding that several of our health centers have been identified for participation in this initiative. These Health Centers include Blue Ridge Medical Center, Boynton Community Health at its Halifax Family Health Center, Johnson Health Center, Piedmont Access to Health Services at its Community Health Center of Danville, Southwest Virginia Community Health Systems at its Saltville, Troutdale and Bristol sites, Stone Mountain Health Services at its Haysi and Appalachia Family Health Center, and Eastern Shore Rural Health Services at its Atlantic, Bayview and Onley sites.

Community Care Network of Virginia was established in 1996 to support the Health Centers' mission of increasing access to health care for the uninsured and underinsured of Virginia. CCNV provides and operates several programs for its Health Centers including information technology (electronic health records adoption), data warehousing and reporting, network wide performance improvement, third party contracting, credentialing, medical and dental billing and compliance.

We believe that the University of Virginia's application for funding under this Pilot Program will strengthen the ability of our providers to improve patient outcomes and quality of care by assisting in providing telehealth access to high-speed voice, video and data connectivity. This will further enable our providers practicing in rural communities to have direct and immediate access to the medical expertise and education that resides within any of the Commonwealth's participating medical centers. In addition, this

6802 Paragon Place, Suite 630 • Richmond, Virginia 23230
804-237-7686 • fax: 804-237-7699 • www.ccnva.com



Karen S. Rheuban MD
Telemedicine Support Letter
April 30, 2007
Page 2

initiative complements Community Care Network of Virginia's strategic vision for improving technology within our safety net provider organizations throughout the Commonwealth.

I am pleased to offer our support of this very worthwhile initiative.

Sincerely,

David R. Selig
Chief Executive Officer

CC: H. Chapman
C. Dill
M. Perdue
N. Stern
J. Sniezek
K. Crane
P. Whitehead
F. Darlington
file



Center for Rural Virginia

glen.sink@cfv.org www.cfv.org

501 North Second St., Richmond, VA 23219, Ph: 804-371-7141, Fax: 804-371-7092

Board of Trustees

April 25, 2007

Chairman: Frank M. Ruff Jr.

Members

Honorable Robert S. Bloom

Secretary of Agriculture

Honorable Allen W. Dudley

Virginia House of Delegates

Honorable Emmett W. Hanger Jr.

Virginia State Senate

Woodrow "Woody" Harris

City Council, Emporia, Virginia

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Virginia Farm Bureau

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Virginia Agribusiness Council

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Mark S. Lawrence

Carlson Health System

Honorable Dave Nutter

Virginia House of Delegates

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Department of Agriculture & Applied

Economics, Virginia Tech

Honorable Jackson E. Reesor

Old Dominion Electric Cooperative

Susan Rubin

Virginia, Maryland & Delaware

Association of Electric Cooperatives

Honorable Frank M. Ruff Jr.

Virginia State Senate

Joseph L. Shelley

New River Community College,

Pulaski County Board of

Supervisors

Steven C. Smith

Food City Stores

William Tucker

Farmer and member, Rural Virginia

Prosperity Commission

Dennis Zimmerman

ComSeries, Inc., Bridgewater

Karen S. Rheuban MD

Senior Associate Dean for CME and External Affairs

Medical Director of Telemedicine

University of Virginia Health System

PO Box 800707

Charlottesville, VA 22908

Dear Dr. Rheuban:

Please accept my letter of support for the University of Virginia Office of Telemedicine's proposal to the Federal Communications Commission to facilitate enhanced access to healthcare services for citizens of rural Virginia. Greater utilization of the Universal Service Fund for Rural Health Care Providers and funding made available to help medical facilities in rural communities gain access to high speed voice, video and data connectivity mirrors the focus of Center and Council for Rural Virginia. One of our six focus areas in 2006 and carrying forward is to promote connectivity, (last mile broadband), to bring badly needed services to rural citizens; healthcare being one of the greater needs. It is exciting to learn that this proposal will have a direct impact on rural communities.

Another Center and Council objective is to promote access to capital for entrepreneurs and small business. Learning that funds may be used to design the network, deploy the technology and underwrite up to 85% of the costs (including ongoing connectivity), I feel confident that matching funds of 15% can be secured. Our hope is that this proposal will offer opportunities for entrepreneurs and small business to be part of expanding and strengthening the infrastructure across which healthcare services are provided. In anticipation of the proposal being approved, the Center and Council will support your efforts to secure funding for the implementation of the clinical component of the proposal.

Identifying serious health issue and establishing ways to deal with them is a huge challenge for the healthcare community. The plan to target poor recognition of patient symptoms, delayed EMS notification and delayed patient to hospital delivery in rural geographically challenged regions further mirrors the Center and Council scope of work. Geographic barriers play a big part in planning as we work with leaders at the local level to assess needs and promote partnerships to meet those needs. Geographical challenges can be overcome through a cooperative effort from individuals and groups who care about the needs of rural Virginia.

Ltr - Dr. Rheuban - - Page 2

It is very encouraging that this proposal is designed to offer greater access to education and prevention programs, and specialty care where not locally available. The plan to connect healthcare centers and healthcare providers in order for patients in rural areas to have access to telehealth services will add great value to rural Virginia. The exchange of medical information within health care systems and across systems again mirror the Center and Council's vision for more affordable, more easily accessible healthcare services to rural citizens across the Commonwealth.

Thank you for allowing the Center for Rural Virginia and the Council for Rural Virginia to place our vote of confidence in your proposal. Our motto: "Partners collaborating to leverage resources and find solutions for the Revitalization of Rural Virginia", tells where the organizations allegiance lies. We wholeheartedly offer our support of the proposal and express our appreciation in advance for the services provided to Virginia's rural areas once funding is secured.

Please do not hesitate to contact me with any questions or concerns, or if you need further information about the Center and Council.

Respectfully,



Glen C. Sink
Executive Director, Center for Rural Virginia

Cc:
The Honorable Frank M. Ruff, Jr.
The Honorable Emmett W. Hanger, Jr.
The Honorable Allen W. Dudley
The Honorable Joseph P. Johnson, Jr.
The Honorable R. Steven Landes
The Honorable David A. Nutter
Joe Newbill, Chair - Council for Rural Virginia
Karen Jackson, Director, CIT Broadband
Cynthia Barrigan, RN, MPH, Consultant, Virginia Department of Health



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April 25, 2007

Karen S. Rheuban MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
PO Box 800707
Charlottesville, VA 22908

Dr. Rheuban:

On behalf of the Virginia Rural Health Resource Center (VRHRC), I am writing in support of the University of Virginia Office of Telemedicine and its multi-agency application for the FCC Pilot Project funding.

VRHRC provides collaborates with various public and private organizations to identify and address rural health issues in the Commonwealth, thus ensuring access to quality health care for all rural Virginians. We are therefore very aware of the many barriers to receiving quality healthcare in rural areas; including geographic isolation, lack of providers, and poor insurance coverage.

Through our affiliation with the National Rural Health Association, we have seen the amazing possibilities for telehealth in rural areas. My understanding is that the goal of pilot project will be to reduce the disparities related to lifestyle diseases through greater access to education, prevention and specialty care. However once the infrastructure and positive environment are established, the opportunities are nearly boundless. Many services once thought to be limited to those who were able to drive to a city - including surgery, home care, mental health and more - are now accessible even in remote areas.

Again, I am pleased to offer the support of VRHRC to this innovative project.

Sincerely:

Beth O'Connor, M. Ed.
Executive Director
VRHRC
540-231-7923
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April 25, 2007

Karen S. Rheuban MD
Senior Associate Dean for CME and External Affairs
Medical Director of Telemedicine
University of Virginia Health System
P. O. Box 800707
Charlottesville VA 22908

Dear Dr. Rheuban:

I am writing on behalf of the board of directors and members of CareSpark, the regional health information organization for seventeen counties of northeast Tennessee and southwest Virginia. We would like to express our strong support and endorsement of your efforts to expand your current telemedicine network to rural health providers, whose involvement is critical to success in our efforts to reduce the significant health disparities that we experience in our region.

As we have worked over the past three years to improve the health status of our region through the collaborative use of health information, our awareness and concern for the high rates of hypertension and stroke in our region have grown. For this reason, we have ranked efforts to reduce incidence of and mortality from stroke to be one of our top five priorities for the next three years. Through the electronic health information exchange that we are currently building, we plan to enable the collection and analysis of health data for the purpose of public health improvement and individual patient care. Thanks to strong support from local, state and national partners for our project, we anticipate the connectivity of our initial providers (hospitals and physician practices serving nearly 600,000 patients in our region) in summer 2007, including Wellmont Health Systems, Mountain States Health Alliance, Holston Medical Group and Johnston Memorial Hospital, with additional providers to be added in 2008 and 2009. Their commitment to collaboration and quality improvement through coordination of care and adoption of clinical best practices has guided our efforts and will assure positive outcomes for both health and cost-efficiency.

We welcome the opportunity to work in partnership with University of Virginia and the Commonwealth of Virginia, along other participants in the statewide stroke initiative. We applaud your leadership in this effort, which promises to bring more adequate resources for treatment and prevention of stroke among rural patients and communities served through our organizations. We pledge our support and participation in this initiative and look forward to many positive results from our work together.

Sincerely,

A handwritten signature in cursive script that reads "Liesa Jo Jenkins".
Liesa Jo Jenkins
Executive Director

working together for better health

APPENDIX D – BIBLIOGRAPHY

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APPENDIX E – VIRGINIA STROKE TASK FORCE**Virginia Stroke Systems of Care
Core Team Members****Brief Biosketch:****1) University of Virginia Stroke Center****Nina J. Solenski, M.D.**

Dr. Solenski is a dual Boarded Stroke Neurologist (General and Vascular Neurology), on staff in the Department of Neurology at University of Virginia. She completed a 3-year clinical and research Cerebrovascular Fellowship training in 1996, and has been a member of the UVA Primary Stroke Center Team since that time. She is currently an Associate Professor in the Department of Neurology with interests in Stroke Clinical Trials (participated, designed or directed > 25 clinical trials to date) and translational research. Stroke research interests include testing and the development of neuroprotective treatment strategies following stroke including drug development, and understanding the neurochemistry of stroke. As an Attending educator she is involved in nursing, resident, and fellow stroke training, as well as peer stroke-related teaching activities (international, national and statewide).

In 2005 to present, she served as the Leader of the Va Stroke Systems of Care Task Force and has actively led the development of the statewide program since its initiation. Having worked closely with the program she will bring expertise to the regional challenges to health equality that the state faces. She will provide stroke neurological expertise to the Va Stroke Telehealth by providing guidance to the selected sites as they develop their institutional programs. Quality assurance and outcome is a central theme of the stroke continuum of care, and she will ensure that national stroke guidelines are followed, and the Telehealth services are fully utilized and the outcome is analyzed.

2) Virginia Department of Health**Fran Darlington, BS, RN**

Fran Darlington is a registered nurse who completed a BS degree with a concentration in health care administration in May 2004 and entered the Masters of Public Health program at VCU, Richmond, Va in the fall of 2005. She has more than 25 years experience, including: direct patient care in the hospital setting; leadership and administration; human resources management; contracting and budgeting; grant writing and management; program planning, implementation, evaluation and management; programming for chronic disease prevention and control; quality assurance and improvement; data management and public health. She serves as Project Manager for the Virginia Department of Health Heart Disease and Stroke Prevention Project, overseeing a \$1,200,000 grant from the Centers for Disease Control to support secondary cardiovascular disease prevention efforts for the Commonwealth of Virginia. Her project is the primary implementing partner for the Virginia Stroke systems Initiative.

3) American Heart Association/American Stroke Association**Keltcie Delamar**

Keltcie Delamar is the Director of State Health Alliances for the American Heart Association/American Stroke Association, representing the state of Virginia with 30 years of experience in program design and implementation. Her background includes extensive work in developing outcomes-driven collaborations and leveraging professional relationships to further organization goals. She has championed numerous causes, including issues related to senior care, vocational and social rehabilitation, and Primary Stroke Center development. She provides leadership to the statewide Virginia Healthy Pathways Coalition, a coalition of community partners working to improve the cardiovascular health of Virginians through focus on communities and worksites, schools, faith-based and medical arenas. She serves as the key

liaison to organizations and partners invested in building Virginia's stroke systems of care through the Virginia Stroke Systems Initiative.

4) Stroke Systems Consulting

Timothy Sheppard, RN. PhD.

Dr. Sheppard has played a sentinel role in both national and statewide stroke care programs- the following represents a sample of his participation and contributions. He served on the Advisory Working Group for Stroke Center Certification. This is an expert panel to define and implement the processes for Primary Stroke Center certification on a national level. He was part of the AHA-ASA, Writing Group for the Stroke Systems White Paper. In 2004-2005 he participated in an expert panel to work in collaboration with Health Policy R & D, Washington, DC, to develop a state of the science paper about the design, development and support structures needed to implement stroke systems in the U.S.

He is currently the Chairman of the Virginia Stroke Ambassador AHA Advocacy Panel; has investigated and introduced legislation to support the Virginia State Stroke Systems of Care Plan Program. He is actively involved in the American Academy of Neurology SPIN (Stroke Practice Improvement Network) project is a national research project with quasi-experimental design to test efficacy of specialty organization to influence evidence based medicine, implementation of clinical practice guidelines, testing of stroke quality indicators and to improve clinical outcomes in a multi-center study.

Appendix E: State Stroke Systems Planning

The mission of the American Heart Association / American Stroke Association (AHA/ASA) is to reduce disability and death from cardiovascular disease and stroke. To support this mission, AHA/ASA identifies and evaluates strategies to improve stroke awareness and prevention and to enhance acute treatment and rehabilitation options. As a voluntary committee was developing the *Recommendations for the Establishment of Stroke Systems of Care* (Stroke, 2005), the AHA/ASA identified the possibility that if every state exemplified the components of this model for stroke care, the result could facilitate significant progress toward the mission and 2010 impact goal, a 25% reduction in coronary heart disease, stroke and risk.

A stroke systems approach involves coordinating stroke care along the entire stroke health continuum, from primary prevention through rehabilitation. A systems approach is necessary to improve how stroke is treated so that patients will have access to the most advanced treatment in centers that are best equipped to deal with the critical, time-sensitive needs of stroke patients.

Each state nationwide designated a AHA/ASA staff representative to lead a multi-year program to coordinate the stroke systems planning. In addition to continuing much of the work on stroke initiatives aimed at improving the system of care, each staff representative was charged with convening and/or facilitating a state leadership group of volunteers and stakeholder organizations (if one did not already exist). The leadership groups typically include organizations such as the Department of Health, state-based healthcare provider associations, state EMS authorities/offices, quality-improvement organizations, and stroke-focused coalitions. These leadership groups are charged with viewing the stroke system from a state level to evaluate available resources and partners and to continue the dialogue and activities designed to improve stroke care in each state.

The essential components of a coordinated system of stroke care were outlined by the national core of stroke experts on the Development of Stroke Systems in the document entitled *Recommendations for the Establishment of Stroke Systems of Care* (Stroke, 2005). This document recommends that any coordinated stroke system should promote patient access to the full range of services associated with stroke prevention, treatment and rehabilitation, including these key components:

- Primary Prevention
- Notification and Response of Emergency Medical Services for Stroke
- Acute Treatment for Stroke
- Sub-Acute Stroke Care and Secondary Prevention for Stroke
- Rehabilitation of Stroke Patients

While the AHA/ASA may bring many resources to bear on many or all of these components, the state-level planning effort is intended to identify

- all of the possible partners,
- its own unique stroke care assets and
- its own set of challenges.

By initiating the multi-year program, it should become clear

- where the gaps are,
- where the greatest needs are,
- where the successes and best practices are.

That sets a foundation for sharing information from state to state in a way that accelerates the improvement of stroke systems of care.

Development of Virginia's Stroke Systems of Care

The development of an invested team of recognized experts to lend their expertise to building Virginia's stroke systems of care was critical for achieving credibility, buy-in, and forward movement in building a fluid stroke systems plan for the state. This team of stroke experts has participated in a closely managed process throughout 2006, structured to make wise use of their limited time, and channel their efforts into creation of viable strategies that can be implemented across the state.

Many key alliances and partners provided representation for the leadership team:

Bon Secours Health System Richmond & Stroke Systems Consulting	Stroke Survivor
Carilion New River Valley Medical Center Dept of Physical medicine & Rehabilitation	University of Virginia, Radiology Department
Centra Health, Inc., Lynchburg General Hospital	UVA Health System, Dept of Adult Acute Care & Neuroscience Programs
Central Virginia Emergency Associates	UVA STROKE CENTER, Dept of Neurology
Central Virginia Health Services, Inc.	Virginia Commonwealth University School of Medicine, Department of Family Medicine Practice-based Research Network: ACORN
CJW, Johnston-Willis Campus (HCA)	Virginia Department of Health Office of EMS
Commonwealth Neuro Specialists, PC	Virginia Department of Health, Cardiovascular Disease Project
INOVA Health System, Dept of Community Health	Virginia Hospital and Healthcare Association
INOVA Rehabilitation Center, Mount Vernon Hospital	Virginia Organization of Health Care Social Workers (VOHCSW)
Montgomery Regional Hospital	Virginia Primary Care Association
OEMS Medical Direction Committee	Virginia Rural Health Association

The group fleshed out a draft core plan that comprehensively addresses all of the components in a stroke system of care, and the policy recommendations in the ASA 'white paper.' The core plan outlines much that needs to be done, and a number of the critical elements are already being addressed.

Movement on Core Work Plan:

- EMS standardized stroke scale formalized
- EMS data project and mapping underway
- EMS training needs assessment underway
- EMS stroke satellite training & DVD done
- EMS standardized enhanced stroke training in development for online access
- Hospital Stroke Survey, validated, mapping underway
- Virginia Stroke Systems Ambassador service
 - guidelines/parameters developed; recruitment and orientation of panel completed
 - Rolled out to stroke community
 - Target participation by SOC hospitals close to PSC status
- Advocacy:
 - Achieved resolution commending Primary Stroke Centers on certification, in 2007 legislative session.
 - Achieved support from Virginia Joint Commission on Health to convene work group/task force to address stroke issues.
- Promotion of Heart/Stroke Recognition Program through Va project
- Development of Virginia Stroke Systems Web environment (for prof ed, resources, consultation)

Next Steps

- Development of Stroke Task Force/work group by Virginia Joint Commission on Health
- Assess gaps in plan
- Determine vehicles, partners, resources for movement on priorities
- Define and pursue funding where needed
- Engage stakeholders, as appropriate

Under consideration for development:

- Social marketing campaign
- Enhancing/promoting public ed programs for high risk populations
- Build strategies to enable physicians to treat-to-target re CVD and stroke
- Standardize enhanced EMS stroke training across state
- Public education about best transport options (family transport vs 9-1-1)
- Public access of hospital stroke survey results
- Development of telemedicine and transport agreements for acute care facilities
- Promotion of Heart/Stroke Recognition Program through state agencies
- Promotion/provision of resource tools such as order sets, protocols, patient target data sheet, hosp discharge summaries for PCPs, JCAHO application toolkit, standardized residual impairment evaluations, guide to rehab categories of service and availability of care, vehicles to promote communication between rehab providers and PCPs, etc

Appendix E: Virginia Stroke Systems of Care: Project List May 2007

(See table of abbreviations at end for interpretation of acronyms)

Projects Overarching All Components:

- Development of Virginia Stroke Systems web pages to provide online resources to health professionals addressing stroke in Virginia.
- Advocacy –
 - Educating public about You're-The-Cure (YTC) grassroots network that enables their voice to be heard on stroke policy issues and increasing stroke stakeholders' membership.
 - Orchestrating stroke advocates' participation in educating policy makers about stroke (via legislative reception, state lobby day, National lobby day, direct contact, etc).

Prevention/Community Education:

NIH/NINDS Know Stroke program - Community education on signs and symptoms of stroke and urgent response.

- Promote Safe Routes to School (SRTS), a grant funded initiative designed to incorporate phys activity into students daily life through elimination of environmental barriers.
- Certified Primary Stroke Centers and other hospitals providing community education on stroke modules for the public.
- Share AHA/ASA online cardiovascular education lesson plans.
- Search Your Heart (SYH) stroke module - implemented in over 100 churches in central, eastern, and northern Virginia.
- Power To End Stroke (African-American stroke education campaign), development and funding of ambassadors in high risk areas of state.
- "Emergency Protocols for Non-Medical Facilities" posters under distribution to work sites.
- VDH/ASA Medical Emergency Response Plan (MERP) Guide developed, in final reviews and nearly ready for distribution to employers.
- AHA Start! walking campaign for worksites.
- Virginia NCQA Heart/Stroke Recognition Program Project working to get physicians recognized for meeting identified measures.

- Fourteen hospitals in Virginia actively utilizing GWTG Stroke (approx 17% of Va hospitals).
- Health Disparities Collaboratives being implemented in Community Health Centers (CHC) through state-based collaborative structure.

Blood Pressure Measurement Specialist Certification training being provided through Virginia Department of Health. (Blood Pressure Measurement Specialist (BPMS) certification training via train-the-trainer classes for health professionals.)

Pilot study underway to explore efficacy of embedding treatment guidelines into EMR programming to generate prompts at point of care (ACORN - Partnerships for Prevention).

EMERGENCY MEDICAL SERVICES

- OEMS (Office of Emergency Medical Services) Satellite training program *Pre-hospital Care of the Stroke Patient* developed and available via web training system.
- Tracking of time of onset and use of Cincinnati Stroke Scale standardized through OEMS Medical Direction Committee.
- Stroke training provided annually at EMS Symposium for field personnel throughout the state
- Standardized enhanced stroke training under development to be distributed to all instructors in state and made available online for download by instructors. Pre-notification of receiving hospital Incorporated.
- .EMS data compilation and early assessment completed; interventions being developed to improve field response.
- Mapping of data depicting EMS response to stroke underway - will overlay with acute care facility locations and roles

ACUTE STROKE CARE

- Hospital survey and analysis completed to identify hospital roles across the state. 100% of Virginia hospitals providing acute stroke care participated. Web-based vehicle for ongoing updating under development.
- Notification of survey status provided to hospitals before public dissemination, with opportunity to update responses.
- Mapping of hospital roles nearly completed.
- ASTP kits distributed to all acute stroke care hospitals in the state.
- Virginia Stroke Systems Ambassador Panel launched and in active operation -- provides expert opinion to stakeholders on acute treatment issues.
- AHA/ASA supporting use of Get With The Guidelines-Stroke in participating hospitals.
- Exploring current usage of telemedicine and its availability/applicability for VA hospitals.

SUB-ACUTE CARE & SECONDARY PREVENTION

- Fourteen hospitals in Virginia actively utilizing GWTG Stroke (approx 17% of Va hospitals).
- Promoting and providing Blood Pressure Measurement Specialist certification training via train-the-trainer classes for health professionals.
- Funding secured through ASA/VDH NCQA HSRP Project to help offset physicians' costs in achieving recognition.
- Development of Secondary Prevention pocket guide underway for distribution to Physicians.
- See Prevention section for community education and provider strategies impacting both Prevention and Secondary Prevention

STROKE REHABILITATION

- Researching tools that define the different levels of rehab along the continuum (for patients, families, Case Managers, Discharge Planners) and makes recommendations for rehab placement based on patient circumstances.

- Developing template/seeking funding to support implementation of Central Virginia Stroke Support Group Development project, positioning stroke group members as agents of change to impact advocacy and community education on stroke.

Addendum Table of Abbreviations, Virginia Stroke Systems Work Plan

AARP	American Association of Retired Persons	EMD	Emergency Medical Dispatch
AHA/ASA	American Heart Association/American Stroke Association	EMS	Emergency Medical Services
ACORN	Ambulatory Care Outcomes Research Network (at Virginia Commonwealth University)	D&S	Drip and Ship (Feeder/Transfer) (hospital category)
AHG	Alliance for a Healthier Generation	EHR	Electronic Health Records
AHRQ	Agency for Healthcare Research and Quality	EMR	Electronic Medical Records
ALLHAT	Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial	ER	Emergency Room
ASTP	Acute Stroke Treatment Program	FIPS	Federal Information Processing Standard
BRFSS	Behavioral Risk Factor Surveillance Survey	GWTG	Get With The Guidelines
CDC	Centers for Disease Control And Prevention	HDSP	Heart Disease and Stroke Prevention
CEU	Continuing Education Unit	HP	Healthy Pathways (statewide coalition with focus on schools, medical, faith, and community/work site)
CME	Continuing Medical Education	HR	Human Resources (ref Directors' Associations)
CMS	Centers for Medicare and Medicaid Services	HSRP	Heart Stroke Recognition Program (for Physicians)
CVD	Cardiovascular Disease	JCAHO	Joint Commission on Accreditation of Hospitals
CSC	Comprehensive Stroke Center (hospital category)	MDC	Medical Direction Committee
DMAS	Department of Medical Assistance Services	MERP	Medical Emergency Response Plan
		NCEP	National Cholesterol Education Program

NCQA	National Center for Quality Assurance	SYH	Search Your Heart (faith based community education curriculum)
NHBPEP	National High Blood Pressure Education Program	tPA	Tissue Plasminogen Activator
NIH	National Institutes of Health	UVA	University of Virginia
NINDS	National Institute of Neurological Disorders and Stroke	VAFC	Virginia Association of Free Clinics
OEMS	Office of Emergency Medical Services	VAFHK	Virginia Action For Healthy Kids
OHPP	Office of Health Policy and Planning	VAFP	Virginia Academy of Family Physicians
PCP	Primary Care Provider	VCU	Virginia Commonwealth University
PSA	Public Service Announcement	VDH	Virginia Department of Health
PSAP	Public Safety Answering Points	VHHA	Virginia Hospital and Healthcare Association
PSC	Primary Stroke Center (hospital designation)	VHI	Virginia Health Information
QI	Quality Improvement	VHQC	Virginia Health Quality Center
QIO	Quality Improvement Organization	VITA	Virginia Information Technology Agency
ROI	Return On Investment	VOHCSW	Virginia Organization Of Health Care Social Workers
rt-PA	Recombinant Tissue Plasminogen Activator	WAV	Well Adult Visit
SOC	Standard Of Care (hospital category)	WMM	When Minutes Matter (ASA senior stroke education program)
SRTS	Safe Routes To School	YTC	You're The Cure (AHA grassroots advocacy network)
S/S	Signs and Symptoms		
SSP	Stroke Systems Plan		

APPENDIX F – NETWORK INFRASTRUCTURE IN VIRGINIA

Telecommunications Network Infrastructure in Virginia

During the past decade, the telecommunication landscape in Virginia has changed dramatically. Investments in infrastructure by the private and public sectors (local, state, federal), Virginia Tobacco Commission³, and others have extended connectivity exponentially beyond where we were even five short years ago. Virginia currently has active deployments of numerous technologies across the state including (but not limited to): open access fiber, triple-play cable, wireless (802.11 and licensed spectrum), Wi-Max, broadband over powerline (BPL), EVDO, and FIOS. However, despite all of the investment and technical industry advancements, there are still locations in Virginia that do not have access to reliable and **affordable** broadband telecommunication infrastructure. In an attempt to fill the gaps and to provide cost parity (rural v. urban) for local telecommunication needs while meeting the internal infrastructure needs of Commonwealth agencies, Virginia has invested in two primary statewide networks – Network Virginia and the Commonwealth of Virginia Network (COVANET).

Network Virginia

Established in 1996, Network Virginia (NWV) is a program of Virginia Tech to promote early access to advanced network technology and services throughout Virginia. Network Virginia's goal is to improve the quality of life and enhance economic competitiveness in our region. Support services range from leveling the playing field in rural and underserved communities to providing the world's most advanced research network infrastructure for regional universities and labs. The network currently supports an active community of scientists, educators, economic developers, government, regulators, and businesses. Currently Network Virginia is an active participant in the following initiatives:

- National LambdaRail
- Internet2
- Mid-Atlantic Terascale Partnership
- Mid-Atlantic Crossroads
- VT Capitol Region

At its core Network Virginia is a consortium of local exchange companies in Virginia led by Virginia Tech and Verizon, providing local access and intraLATA switching services. Verizon is the prime

³ During the past decade, the Virginia Tobacco and Community Revitalization Commission (a 31 member Commission created in 1999 by the General Assembly to promote economic developed in Southside and Southwest Virginia) has invested more than \$61 million dollars in open access broadband infrastructure in Southside and Southwest Virginia.

contractor for the local exchange companies, called the Vision Alliance, and coordinates all network management and order processing within the consortium. An interLATA backbone is provided by Sprint. The legacy NWV backbone is operates with three ATM switches strategically located around the state to provide interconnection points for Vision Alliance switches. Recently, Sprint added a core IP backbone network including a diverse mesh of OC12c packet over SONET (PoS) links. Sprint is also providing Internet backbone gateways in Washington, Roanoke and Richmond each at OC12c capacity for a combined aggregate Internet access capacity of over 4 gigabits per second. This Internet service is open to all participants. Sprint also provides a gigabit ethernet gateway from the IP backbone to a National LambdaRail / Internet2 gigaPOP facility operated by Virginia Tech in the National Capital Region. Serving an estimated 1.3 million people, NWV offers access to a rich array of educational and information resources. Originally designed to handle advanced multimedia applications for research and education, the network is open to anyone including businesses.⁴

Commonwealth of Virginia Network (COVANET)

In 2000, Verizon (then MCI) built and designed COVANET, an integrated data and voice communications network to serve as the platform for Virginia's e-government initiatives. COVANET was designed to deliver advanced communications services to state agencies, local and county governments, public universities, and schools. COVANET combined public Internet and private frame relay and ATM technologies. The architecture of the COVANET network includes diverse OC-12 trunking throughout the Commonwealth of Virginia and trunk facilities between all ATM switches to support full and automatic network restoration. This redundant network is overlaid on a SONET ring architecture. In addition to frame relay transport, COVANET also provided state agencies with features such as FR/ATM Service Interworking, PVCs to the Internet, and customer network management reporting.⁵

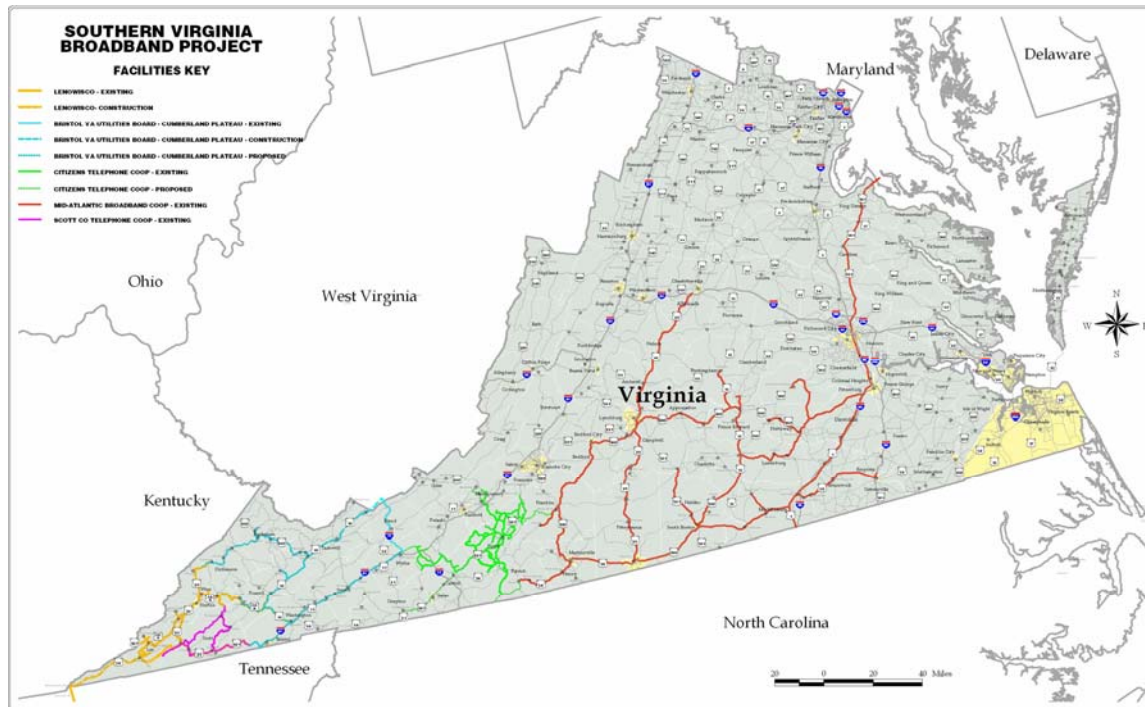
Virginia Tobacco and Community Revitalization Commission Funded Networks

Aside from the Commonwealth investments in Network Virginia and COVANET, the Virginia Tobacco Commission is the largest single source of funding for telecommunication projects in the Commonwealth. Recognizing that robust infrastructure and affordable connectivity is paramount to economic development the Commission has concentrated their funding on the construction and lighting of open access fiber networks throughout the Southside and Southwest Virginia Tobacco Counties. To date, the Tobacco

⁴ Information obtained from the Network Virginia website (<http://www.networkvirginia.net/netva>)

⁵ Information obtained from the Verizon COVANET website (http://www.verizonbusiness.com/us/govt/state_solutions/covanet/)

Commission has provided more than \$65 million dollars in funding and has partnered with localities and providers throughout the region to bring the dream of economic parity to fruition. Partners to date include: Cumberland Plateau and LENOWISCO Planning Districts, Bristol Virginia Utilities, Mid-Atlantic Broadband Cooperative, Citizen's Telephone, and Scott County Telephone to deploy fiber from Lee County (far Southwest Virginia) to Emporia.



APPENDIX G – BVU NETWORK DIAGRAMS – USE CASE 2

